INDIA RUBBER WORLD

Published at 420 Lexington Avenue, 400 Graybar Building, New York, N. Y.

Volume 85 | New York, December 1, 1931 | Number 3

Processing Estate Rubber

Suggestions for Changes in Present Practice on the Plantation

George H. Carnahan[1]

ALL crude rubber producing companies are faced with the necessity of reducing costs to an absolute minimum if they are to emerge from the present depression with potential earning capacity unimpaired. Furthermore they must prepare for the long-pull cost contest with the individual Asiatic producer, in which the heavy expense of Caucasian management and technical supervision must be justified on the score of increased efficiency and the production of a superior article. As to the latter factor, the appraisal must rest with the consumers, chiefly represented by the American manufacturers of rubber goods, and from a practical standpoint the only worth while evidence of approval is an equitable price differential.

Latex Spraying Plant in Sumatra

Substantially all plantation rubber, following acid coaguation, washing, and sheeting, is now dried to a moisture content of approximately one per cent by one of the following methods.

Smoking

The rubber is smoked in specially constructed houses where the wet sheets are hung on poles and exposed to smoke for from 9 to 14 days, the poles being turned at intervals to avoid marking or blemishing of the sheet during drying. For generating the smoke and the heat a small furnace is supplied which is currently fired by hand with green or partially green wood with dampers arranged to induce incomplete combustion and the distillation of a considerable proportion of the non-cellulose constituents of the wood: viz., resins, acids, lignin, etc., thus creating a rather dense smoke partially diluted with warmed air. Under ordinary conditions temperature uniformity is not even attempted although a range of 110 to 120° F. is supposed to give best results, and firing the furnace is judged by the attendants largely on the amount and the quality of smoke produced. The wet sheets are printed with corrugated or indented surfaces, have an average thickness of around ⅛-in. and, when dry, weigh approximately 9 oz. per square foot. When hung in the smokehouse, the wet sheets carry 25 to 30 per cent moisture. The product of this operation represents perhaps 80 per cent of all rubber produced on the plantations and is called "ribbed smoked sheet." "Amber" sheets, blankets, etc., are for the most part of Asiatic production, remilled and air dried in Singapore.

Creping

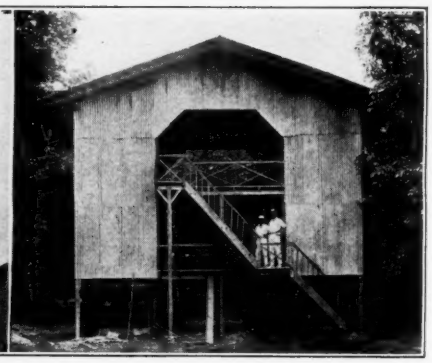
Pale thin crepe is sheeted out to a thickness of approximately 1/16-in. on differential rolls that give a creped surface. This crepe is hung in large buildings arranged with controlled air ventilation without heat and dries to one per cent moisture in from 3 to 4 weeks, depending on weather conditions. Small amounts of sodium bisulphite usually are added to the latex to induce maximum and uniform paleness in color.

The practice of smoking rubber and the production of ribbed smoked sheet are an inheritance from the primitive methods employed in coagulating and partially drying wild Para rubber over a slow fire, which process necessarily resulted in a brown color and a distinctive odor as of wood creosote. It was formerly believed that the absorbed creosote and other products of wood distillation helped to preserve

[1] President, Continental Rubber Co. of New York.

the rubber and enhanced its properties after vulcanization. While there may have been some foundation for this belief in the case of wild Para rubber, which was never fully dried in the forest, modern methods of rubber manufacture, including accelerators and aging compounds, have completely changed the situation. On the other hand varying methods of smoking and the use of woods carrying varying volatile constituents tend to result in a baffling lack of uniformity in the vulcanizing properties of rubbers, especially after prolonged storage, which exhibit no detectable variation on ocular examination. Also the brown color of ribs makes this material impossible for rubber articles that have to be colored artificially, and this reason is the principal one why there is a continuing market for pale crepe which is nearly white in color. There is a slight increase in the dry weight of smoked rubbers due to the absorption of extraneous materials, but at present prices this factor is unimportant.

Crepe Air Drying Shed



Sheet Smoke House—Verandah Type

One large American-owned plantation company introduced and is now extensively employing a system of rubber preparation (the Hopkinson Process) by which the liquid latex is sprayed into a chamber of air that has been heated to 600° F. The product is both dry and uncolored and contains all of the solids that are carried by the latex in addition to pure caoutchouc and includes substantial amounts of resin, proteins, mineral salts, preservative, etc. For many purposes (perhaps for all) it has properties that are superior to conventional ribbed smoked sheet, and a study of this has helped to explode the old theory that materials absorbed from the smoke had any beneficial effect on the vulcanized products. The system, however, can only be economically employed in large units where fuel oil is readily available. Also it is probable that the non-rubber content is higher than optimum results demand.

On a great many estates the excessive amount of firewood wastefully used in the production of ribbed smoked sheet is a serious item of expense, this because it is burned while containing relatively high percentages of moisture and also because incomplete combustion is deliberately induced. The entire operation, furthermore, is carried out with a view to securing dryness with a uniform brownish color, and each smokehouse has 2 furnaces requiring constant attention with no ready means of adapting automatic control by thermostats or otherwise. Obviously there is also a heavy investment in large buildings and appurtenances made necessary by the long period required for moisture elimination which is a secondary objective to the procurement of a uniform discoloration of sheets which are almost pure white when first exposed to the smoke.

There is reason to believe that substantial savings plus improved tensile-elongation properties and uniformity of vulcanization could be effected by a reversal of the objectives now striven for, in which rapid and uniform drying would be of major importance and color an unimportant incident. Experience has shown that no oxidizing or other harmful effect results from drying rubber sheets with heated air carrying a predetermined amount of moisture artificially and automatically controlled.

Under average conditions on eastern plantations approximately two tons of firewood are required to "smoke" one ton of dry rubber. In other words it takes 4,000 lbs. of fuel carrying, say, 25 per cent moisture to evaporate, say, 800 lbs. of water carried by the rubber, which means that more of the fuel value of the the wood is expended in driving off its own moisture than in evaporating water from the rubber and that from a drying standpoint the overall efficiency is ridiculously low.

Smokehouses are customarily built in relatively small units. Thus an estate producing 6,000 lbs. of dry smoked sheet per day will have 6 houses, each equipped with 2 independent furnaces requiring individual stoking and attention. One incentive for splitting up the houses into small units is to minimize the fire hazard, which is obviously high in a wooden structure containing inflammable rubber (a pure hydrocarbon) and directly exposed to the products of combustion.

The obvious alternative for anyone providing new equipment would be a wood fired boiler, steam pipes in a closed structure with regulated air currents, temperature and humidity control, etc., and in such case standard rubber drying chambers, as employed at Akron and elsewhere, could be used with temperature and other automatic controls already worked out and applied.

With a modern chamber drying installation as above, there is no reason why the rubber, at least during the early stages of drying, should not be heated up to 180° F. if supported on standard wire frames, or much higher than temperatures now employed in smoking. Such a degree of heat is believed to be sufficient to sterilize the rubber and kill fungus spores, etc., thus making it unnecessary to wash out or seriously dilute the natural serum that would accompany the rubber after merely pressing the coagulum into sheets of the desired width and thickness. It is known that the nitrogenous materials carried by the serum are beneficial in vulcanization, acting as a mild accelerator and improving uniformity. Their retention in ribbed smoked sheet in an unsterilized condition is believed to induce mildew and other fungi causing a price discount when the rubber reaches the market, although not actually detracting from its usefulness.

As part of the effort to reduce residual serum to a minimum, most plantation latex is now diluted to 20 per cent solids, although it comes in from the fields with about 33 per cent. In other words 3 gallons of raw latex carrying 2 gallons of water are diluted to 5 gallons carrying 4 gallons of water, cutting the residual non-rubber solids in half and making subsequent washing of the coagulum more effective. Thus factory practice would be materially simplified if efforts to eliminate all of these beneficial non-rubber solids are abandoned. The solids in raw latex vary somewhat from day to day, and it is desirable always to deal with a standard hydrometer reading; but there appears to be no reason why this standard should be fixed below 30 per cent. The raw wet sponge of coagulum would be more closely knit and more easily handled but might require heavier rolls than the light affairs usually installed on plantations.

In the matter of present and future firewood costs, the following extract from Circular No. 81 of AVROS General Experimental Station, East Coast of Sumatra, dated Medan, October 25, 1928, is of interest. (1 Guilder cent = .4 American cent.)

The Supply of Firewood for Smokehouses

"The majority of rubber estates on the East Coast prepare their product in the form of smoked sheets, and the reason for this is to be found principally in the lower capital costs of the factory, higher delivery weight, and saving of packing and freight expenses. (As compared to pale crepe.)

"If, however, such an estate is faced with a shortage of firewood and is compelled to obtain supplies from outside, the above advantages are counter-balanced by corresponding disadvantages. For the older estates which are fully planted up and where thinning-out wood is scarce, the question of fuel supply will be a very important one in the near future. For those estates which still have reserve land, the timber on which, however, has been used up, the subject deserves consideration.

"The following figures can be taken as a guide.

"Assuming that sufficient forest land is available, and that 5 staple metres 2,150 kg.) of timber are required for 1,000 kg. dry sheet, that felling and cutting costs are f.1.50 per staple metre, and transport f.0.50 then the total costs amount to f.10.—per 1,000 kg. or 1 cent per kg. rubber.

"If the timber had to be obtained from outside sources, the total costs would amount to f.6—per staple metre or 3 cents per kg. rubber,[2] in addition to which it is to be expected that future timber prices will still increase. For those estates which still possess reserve land the eventual planting of timber for use as firewood might be considered, and although the price at which such firewood can be produced is very difficult to estimate, f.4—per staple metre can be taken as approximate."

For chamber drying the following factors may be taken as reasonably accurate:

1. Available jungle hardwood, if stored under sheds, will dry down to 18 per cent moisture. If properly fired under an inexpensive boiler, a pound of such wood will generate 5 pounds of saturated steam at 10 pounds pressure.

2. A modern chamber dryer under automatic control of air, temperature, and humidity will dry a charge of 6,000 lbs. of raw rubber sheets (dry basis) to under 1 per cent moisture in 18 hours with an expenditure of 2½ lbs. of steam for every pound of water removed. Hence each pound of wood burned will eliminate 2 lbs. of water. The only power required would be a small gasoline or electric motor to drive a ventilating fan. All steam condensed in the heating pipes would be trapped back into the boiler, thus eliminating scale trouble and producing "fool proof" boiler operation with one reasonably intelligent fireman.

3. The water accompanying 6,000 lbs. of dry rubber will weigh, say, 2,500 lbs, which would be eliminated by burning 1,250 lbs. of air dried wood over a period of 18 hrs. Under present standard estate practice approximately 12,000 lbs. of green wood are required to remove the same moisture. If the latter weighs 10,500 lbs. when dried to 18 per cent moisture, then there is a reduction in actual wood consumption of approximately 88 per cent.

4. During the early stages of drying, water evaporation from the rubber will be at a relatively rapid rate requiring the generation and condensation of double the *average* rate of steam—or about 600 lbs. of steam per hr. burning 120 lbs. of wood. Considering the relatively low efficiency of a wood fired boiler, one rated at 25 hp. should be provided with specially made grate bars and fire box for wood burning.

5. The chamber required might have an interior volume of 6,000 cu. ft. and a length of 40 ft. The sheets would be supported in a horizontal position on light wire frames carried in superimposed tiers on truck-racks running on rails. The day's run of rubber would be ready for closing up in the chamber by 3 p.m. and would be ready to be shoved out to the packing room by 9 a.m. the following morning. Such a plan, of course, would necessarily involve scrapping the present smokehouses, but, in addition to fuel saving, factory labor could surely be cut in half, since the crepe and off-grade output could be dried in the same way, and handling sheets to and manipulation within the smokehouse would be eliminated.

Another item of plantation expense that it is difficult to justify is the cost of the veneer chests in which most rubber is packed for shipment. The extra cost as compared to carefully wrapped bales is approximately $4 per ton, and there is no corresponding benefit to the user of the product.

Still another unjustified bugaboo of rubber dealers and graders is the presence of gas bubbles or blisters in smoked sheet. Although harmless from a manufacturing standpoint, the complete elimination of gas is responsible for a great deal of unnecessary labor, manipulation, and inspection in the estate factory, but a price discount is likely to be the alternative.

It is a disagreeable fact that a well equipped and well managed Caucasian estate turning out 6,000 lbs. of standard quality rubber per day finds it necessary to employ no less than 70 men in and around the estate factory and packing room in order to meet the head-wagging specifications of many buyers.

It is merely axiomatic to say that all costs, both necessary and unnecessary, are eventually borne by the consumer. In the cases herein dealt with the cooperation of American rubber manufacturers is required and doubtless would be afforded if questions of this kind could be dealt with by a coordinating body of producers and consumers dedicated to the proposition that they have a mutuality of interest which it is desirable to recognize, cultivate, and preserve.

[2] Fifty-five cents U. S. Cy. per lb. or 10 per cent of the current value of the rubber delivered in New York.

New Rubber Dusting Material

THE ordinary dusting powders used for temporarily suppressing the tackiness of raw rubber are open to the objection that their presence tends to create lines of cleavage between two contacting surfaces because the powders are infusible and not readily removable by washing. In order to obviate this difficulty it has been proposed to substitute zinc stearate for the powdery substances. This compound fuses below the usual heat of vulcanization and blends with the rubber, forming a perfect union between the rubber surfaces. The objection to zinc stearate is its toxic quality which prevents its use for dusting.

According to a new invention[1] the surfaces of uncured rubber are dusted with a powder containing a soap of a metal having an atomic weight between 24 and 27. These soaps effectively prevent adhesion at normal temperatures. However, when uncured rubber so coated is made up into articles and vulcanized, these dusting materials readily fuse at comparatively low temperatures and flow and blend with the rubber as perfectly as zinc stearate does. The soaps, when so blended, do not impair adhesion between the treated surfaces. In fact adhesion is actually improved in some cases. This is because the compounds, when fused, act to some extent as plasticizers and thus enhance the tacky or adhesive properties of the rubber. The oleates, stearates and palmitates of magnesium and aluminum are specific examples of compounds which may be thus employed.

[1] British Patent No. 346,489, complete accepted, Apr. 16, 1931.

Heveatex Products

J. Edwardes[1]

Collecting Latex in Malaya

HEVEATEX is the trade name adopted to denote a series of preserved, concentrated, or processed Hevea rubber latices originally prepared for shipment under European supervision in the Far East, on estates especially selected by the Heveatex Corp. Although the utilization of preserved latex in industry has made phenomenal strides since 1920, it is not even yet fully realized by new experimenters or users that the raw commodity from different sources is far more variable than the plantation crude rubber of commerce, the variability of which caused so many complaints in the past from rubber manufacturers.

Physiological factors are to a large extent responsible for some of the variation in plantation rubber. To quote de Vries[2], "One of the chief causes of differences in first quality plantation rubber is the fact that practically any group or combination of trees produces rubber of somewhat different properties, notably different in rate of cure."

It stands to reason that the variation must be accentuated in the case of the latex from which the rubber is prepared. For example, the age of the trees seems to have very little effect on the properties of the rubber[3]; yet this factor is responsible for a marked variation in the composition of the latex as is clearly evinced in the following table[4].

VARIATION IN COMPOSITION OF LATEX DUE TO AGE OF TREES

	4-Yr. Old Trees	10-Yr. Old Trees
Water	70%	60%
Acetone extract	1.22	1.65
Protein	1.47	2.03
Ash	.24	.70
Sugars in aqueous extract of solids after inversion (calc. as glucose)	.21	.12

Further factors which have a marked effect on the properties of both rubber and latex are tapping systems and resting periods, the influence of which has been studied extensively and stressed in text-books on plantation rubber[5]. The following table[6] illustrates the effect of tapping after a period of rest, on the composition of the latex. (Heavy tapping system.)

		1st Day	18th Day	33rd Day
Rubber content of latex, per cent		43.0	25.8	14.8
Total solids in latex, per cent		45.1	29.2	17.3
Nitrogen	% in latex	.28	.24	.18
	% in total solids	.61	.81	1.06
Ash	% in latex	.60	.63	.77
	% in total solids	1.34	2.17	4.47

When the factor of preservation is also taken into account, it is obvious that the selection of a reliable source of raw material is of paramount importance to any manufacturer contemplating experimenting with latex, and it is clear from the foregoing remarks that proper tank equipment for bulking on the estate is essential. Many disappointments have occurred to purchasers buying latex in the open market from sundry sources, and heavy losses have been incurred, which have militated against its successful adoption in many new manufacturing processes.

Since its inception the producers of these products have endeavored to market standard and absolutely uniform grades of latex, and no effort has been spared in locating reliable sources of supply. The old plantation method of packing latex in kerosene tins has been discarded as, in addition to being both laborious and costly, the ammonia was found to react with the containers, imparting a grey tinge to the latex and rendering a uniform standard impossible to maintain.

The development of compounding methods and the processing of latex for special requirements has also been advanced with extremely gratifying results. Recently an unique method of compounding not only sulphur in true colloidal dimensions but also any organic accelerator has been discovered. This development is expected to have far reaching results.

Anyone who has experimented with latex will appreciate the value of efficient technical control, and manufacturers of a wide variety of articles have been supplied with processed and compounded materials suitable for their needs at a cost which they could not possibly have attained had they set out to solve their own problems themselves.

At the present time Heveatex products are being used for the production of the following goods: surgeons' gloves, balloons and other dipped goods, sheet rubber, breaker strip, and tire carcasses. Another wide field in which these products have been unusually successful is the saturation of absorbent papers and fabrics for the production of imitation leather. These imitations closely resemble the natural product and possess remarkably high tearing strength. In this connection it may be mentioned that in the initial development of latex papers, great difficulty was experienced because of the poor aging of thin rubber films deposited on

(*Continued on page* 58)

[1] Formerly chemist in Malaya for the Rubber Growers' Association.
[2] *Arch. Rubbercultuur*, 1917, I, 280.
[3] de Vries, "Estate Rubber," pp. 56-57.
[4] C. L. Beadle and H. P. Stevens, *India Rubber J.*, 44, 1911, p. 216.
[5] See de Vries, "Estate Rubber," and Whitby, "Plantation Rubber and the Testing of Rubber."
[6] de Vries, "Estate Rubber," p. 64.

Molds for Rubber Goods[1]

Plain and Machined Single Plate Molds for Belting, Slabs, Valves, Mats, and Matting—Single Plate Mold Covers

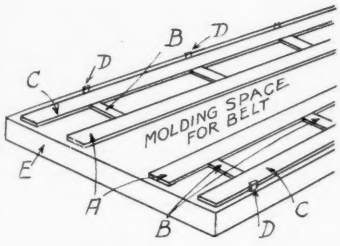


Fig. 1. Bar Mold for Belting

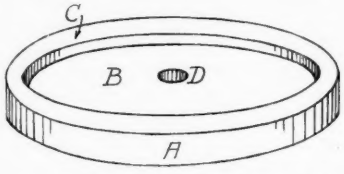


Fig. 2. Base Plate for Valve Mold

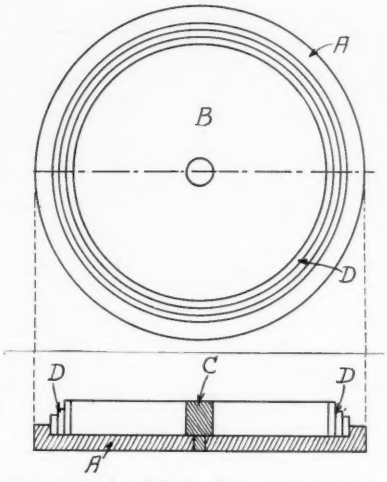


Fig. 3. Valve Mold—Plan and Section

PLAIN flat goods such as belting, rubber packing in slabs, sheet tiling, etc., are vulcanized in an hydraulic press on the platen of which, flat steel bars are temporarily used to mold the goods to definite thickness and also to form the edges straight or to a desired outline. In the case of belting this type of molding is ordinarily used to form the edges square and the thickness uniform.

For this purpose what is essentially a mold is formed on the bottom plate of the platen with press length bars as indicated in Figure 1 where AA indicate bars of flat steel of press length between which the material to be molded is confined under hydraulic pressure while being cured. In order to keep the bars AA fixed in position, short pieces BB of similar flat steel squared at their ends are placed at intervals along the press plate at right angles to bars AA and CC. The latter are supported against pins DD set in the extended edge of the bottom press plate. This disposition of bars thus serves as a mold of definite width with the mold pressure supported by the pins.

A mold for slabs and sheet tiling can be similarly arranged on a removable slab of steel or iron furnished with ledges all around its edges on one side. The ledges serve to support the thrust of the molding bars under pressure of the press. On a plate of this sort bars can be arranged to mold shapes of any outline, such for example as flooring molded in one piece to fit elevators or any irregular space.

When curing sheet tiling on a plate of this sort it is necessary that the area of the uncured sheet exceed that of the molding cavity by about ⅛-inch per foot in both directions to insure good vulcanized union of the cemented joints between tiles.

The bar and plate method of forming a mold cavity is an inexpensive and practical way to make molds for pump valves. This adaptation permits one easily and quickly to make changes in valve mold dimensions to accommodate a valve of any desired diameter, thickness or hole.

As a base for such a valve mold a light cast-iron circular plate is needed machined as pictured in Figure 2. The plate A is about an inch thick by 8 in. in diameter, and the cavity B about ½-inch deep, leaving a ledge *C* of about ½-in. square section around the circumference of the plate for supporting the curved liners used to form the sides of the mold cavity. In the center of plate A is bored a hole D of small diameter to receive shouldered pins that serve to mold the hole through the valve.

On such a base plate can readily be constructed a valve mold of sizes within the limits of the plate diameter. Besides the base plate and the material needed to build the mold there is required a stock of narrow square-edge flat mild steel ⅛-in. thick from which to form rings or bands. These serve as a wall for the mold cavity and give to it the desired diameter. Several rings may be required to effect the size reduction from the plate diameter to that of the required valve mold. The necessary depth of cavity is obtained by using steel of different widths. The innermost or final ring of the group fitted in any plate determines both the diameter and the thickness of the valve the cavity will mold.

Bending and fitting the steel to form is conveniently done in the machine shop where a mechanic first cuts the strip steel to approximate circumferential lengths, then bends them in circular form in a set of ordinary hand-power bench rolls built for that work. After a strip is bent to shape its ends are sawed and filed square and hammered in place on the base plate with an easy driving fit. The plan and sec-

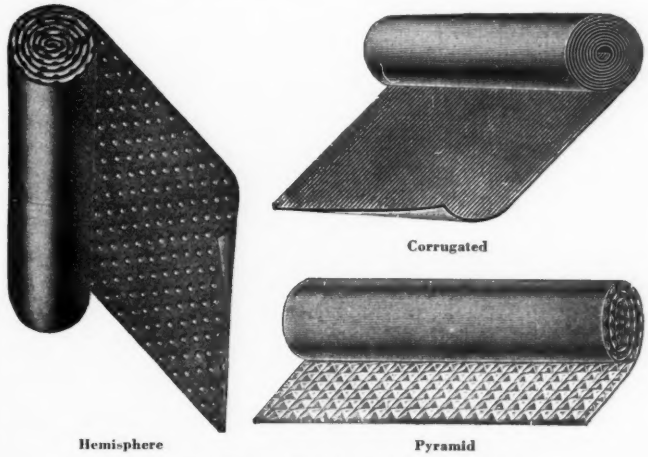


Fig. 4. Home Matting Mold Designs

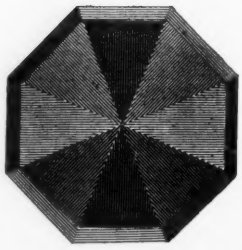
[1]Continued from India Rubber World, Nov. 1, 1931, pp. 49-50.

tion of a valve mold built up on a base plate after this method is shown in Figure 3, where A indicates the recessed base plate bored at the center B for shouldered pins C, and D indicates the reducing rings in place on the plate A.

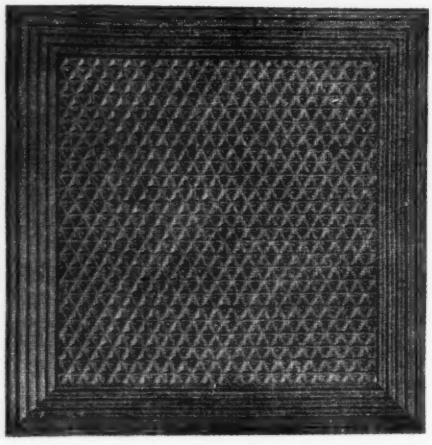
A collection of interchangeable rings accumulates in using this valve mold method. For standard valve sizes the base plates once fitted remain unchanged as long as needed. When valves of other diameters and thicknesses are required, mold cavities to suit can be quickly and cheaply arranged by a change in the number, height, or arrangement of rings used or both. Base plates, rings, and shouldered pins can readily be standardized, thus forming a system of interchangeable facilities by which molds for any size of pump valve disk can be readily and inexpensively made. Quantity production is possible with this valve molding system by partially vulcanizing the goods in the molds and finishing the cure in open steam. The latter stage is accomplished by piling the semi-cured valves in regular cob-work fashion on a flat iron surface vulcanizer truck for the finishing cure.

This mold method has the advantage of greater cheapness and flexibility over that of machining heavy cast rings to size as valve molds.

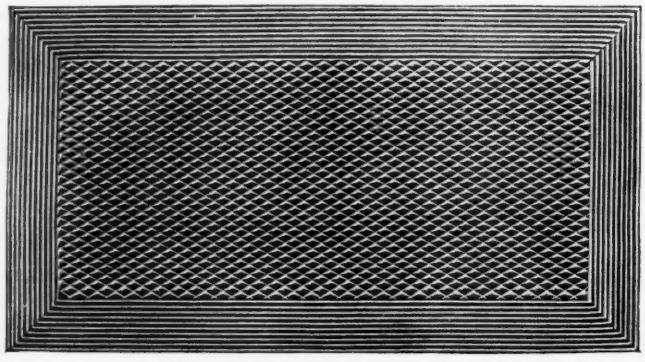
Molds for matting vulcanized in roll lengths are simple steel plates made in widths and lengths to fit press plates with top surfaces machined in such designs as V-shaped corrugations, pyramid effects, or hemispherically cupped. Plates machined in these ways are used for molding cloth backed calendered rubber stock serve as the familiar corrugated, pyramid, or knob matting pictured in Figure 4.



Manhattan Cuspidor Mat



Western Landing Mat



N. Y. B. & P. Co. Door Mat

Fig. 5. Mold Mat Designs

The usual cellular rubber door mats and others like those represented in Figure 5 are formed and cured from sheet stock in single plate molds. These are commonly cast in iron in the usual way from patterns. In the case of corrugated low relief mats the mold surface may be of rubber. The design is produced by piecing it together as an inlay cemented in a slab of frictioned heavy duck, finally vulcanizing the rubber construction upon a recessed iron plate. The finished mold is thus supported by metal around and below, and distortion of the design prevented.

For small press work single plate molds are usually covered with pieces of moderately heavy gage planished plate iron. Door mats and matting are molded under a more or less pliable cover such as cloth insertion sheet packing or a piece of plain duck if it is desired to impress the back of the goods with a heavy textile effect. A pliable cover is desirable for molding wide matting and slabs of rubber in order to compensate for any inequalities in gage of the stock being molded and thus prevent air marking the goods by causing the air to escape as the rubber fills the low places in the design. For this reason a cushioning cover is especially needed when molding cellular door mats.

Industry and Trade

AUTOMOBILES produced in the United States and Canada in October are estimated at 81,300 units, 43 per cent less than output in September and 49 per cent lower than output in October a year ago. In recent years the average movement between September and October was a 3 per cent decline, followed in the succeeding month by a 30 per cent decline. A year ago the seasonal movement came earlier than usual.

During the first 10 months 2,283,000 cars and trucks were turned out as compared with 3,206,694 in the January-October period last year, a decrease of 28.7 per cent.

New passenger car and truck registrations in the United States during the first 10 months, with October partially estimated at 110,000, gives a total of 2,022,501 as compared with 2.806,754 last year. This is a decline of 28 per cent.

Because of the unusually large number of manufacturers changing models in November, it is estimated that production will be slightly lower than October, but December will reflect a considerable increase in production of the new models.

Consumption of crude rubber by manufacturers in the United States for October decreased 5.8 per cent as compared with September. The usual seasonal decline is 3.0 per cent. October consumption estimated at 22,277 long tons, as compared with 23,638 long tons for September and 27,516 for October, 1930.

Imports of crude rubber for October totaled 41,395 long tons, an increase of 2.2 per cent over the September figure of 40,505 long tons, but a decrease of 5.3 per cent under October, 1930.

Total domestic stocks of crude rubber on hand October 31 are estimated at 273,456 long tons, an increase of 7.5 per cent over September and 47.4 per cent over October 31, 1930

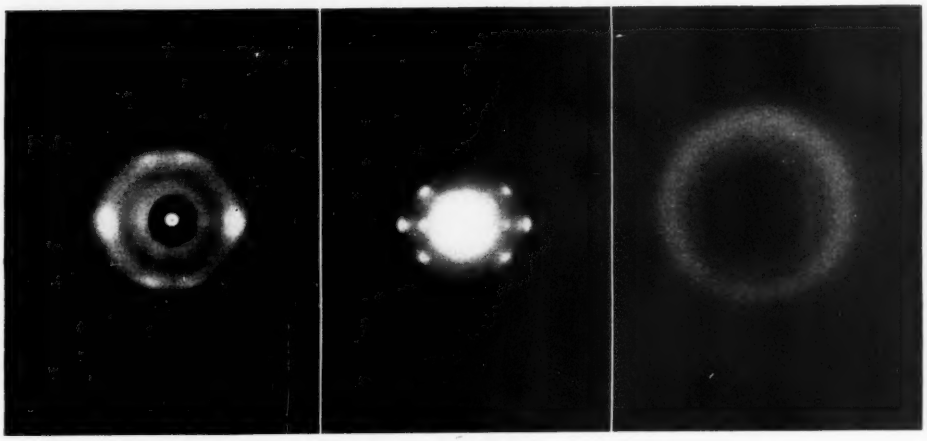
Shipments of pneumatic casings for September were 3,931,860 casings, a decrease of 20.7 per cent under August this year, as compared with the average seasonal decrease of 15.2 per cent, and 10.7 per cent below September, 1930.

Stocks of gasoline on hand at the end of October are estimated at 33,300,000 gallons, a decline of 3 per cent under stocks held at refineries on October 1. Stocks held were 14 per cent under what they were on November 1, 1930.

The New Synthetic Rubber[1]

A Polymer of Chloroprene

AT a meeting of the Akron Group of the Rubber Division, American Chemical Society, which was held in Akron, O., on November 2, chemists of the du Pont Co. announced the results of extensive investigations that had led to the development of a new synthetic rubber made by the controlled polymerization of chloroprene —that is, 2-chloro-1, 3-butadiene. The du Pont Co. also announced that a plant is being constructed for the manufacture from chloroprene of the new synthetic rubber to which the trade name Duprene has been applied.

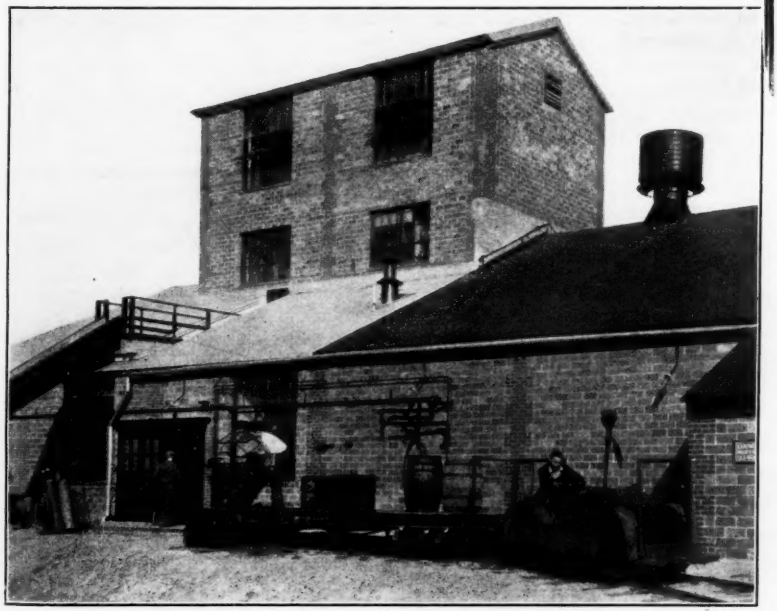


X-Ray Diffraction Pattern of μ-Polychloroprene (from Latex) Stretched 500 Per Cent

X-Ray Diffraction Pattern of Lightly Cured Smoked Sheet Rubber Stretched 500 Per Cent

X-Ray Diffraction Pattern of α-Polychloroprene (Unstretched)

The papers read at the Akron meeting revealed that chloroprene is made by the addition of hydrogen chloride to monovinylacetylene which is in turn made by the catalytic polymerization of acetylene. It follows that all of the raw materials required for the manufacture of the new synthetic rubber are available in almost unlimited quantities.



Plant at Deepwater Point, N. J., for the Manufacture of Duprene

The composition of caoutchouc was first determined by Michael Faraday more than a hundred years ago. In 1860, Greville Williams produced a hydrocarbon by the dry distillation of rubber and upon determining its chemical formula named it "isoprene." He further found that isoprene may be polymerized and apparently recognized that rubber is, in fact, a polymer of isoprene. Since that time, repeated efforts have been made to synthesize rubber from isoprene, butadiene, and dimethyl butadiene, but none of these syntheses has produced a material equal to natural rubber for the production of soft vulcanized rubber articles and none of them has been commercially practicable except as a last resort when the supplies of rubber to certain European countries were cut off during the war.

The many efforts that have been made to produce synthetic rubber have been due in part to the outstanding importance of rubber synthesis as a scientific problem, to the limitations of natural rubber which greatly restrict its use, and to the desire of every country to have a domestic source which cannot be cut off in time of war. It is, therefore, a matter of great scientific and industrial interest that a commercially practicable method has been found for the manufacture of a synthetic rubber which is actually superior to natural rubber in some respects and which would, in the event of national emergency, be a quite satisfactory substitute for natural rubber for many of its present uses.

[1] *Ind. Eng. Chem.* (News Ed.), Nov. 10, 1931.

Although chloroprene differs chemically from isoprene only in that a chlorine atom replaces the methyl group, it polymerizes spontaneously at many times greater velocity than isoprene and the resultant product is a fully vulcanized rubber having properties similar in a general way to the products obtained by vulcanizing natural rubber with sulphur. It is neither necessary nor desirable to add sulphur to produce a fully vulcanized rubber from chloroprene.

It has also been found possible to stop the polymerization at an intermediate point, thereby obtaining a plastic polymer which has the general properties of unvulcanized rubber. This material may be compounded with fillers, diluents, etc., the same as natural unvulcanized rubber. The polymerization or vulcanization can then be completed merely by heating it for a short time at a moderate temperature of 110° to 130° C. Natural rubber and all previously known synthetic rubbers require the addition of sulphur chloride, sulphur, or a related element in some form in order to effect vulcanization. It is believed that the discovery of this rubber, which can be vulcanized by heat alone, will be of great assistance in the study of the vulcanization process.

Compared with natural rubber this new synthetic rubber is more dense, more resistant to water absorption or penetration by water, less strongly swelled by petroleum hydrocarbons and most other solvents, and less permeable to many gases. It is much more resistant to attack by ozone, oxygen, and other chemicals.

Chloroprene rubber is highly resilient, which is presumably partly due to its freedom from the impurities found in natural rubber. It does not soften under the influence of heat but hardens slowly when heated at high temperatures. Consequently the methods used for reclaiming vulcanized natural rubber are not applicable to chloroprene rubber. Except for a temporary thermal effect, milling does not soften the plastic polymer, which may be partly due to its resistance to oxygen. Acidic materials, which retard the polymerization of natural rubber, do not have this effect on the chloroprene plastic polymer and, since the latter contains no sulphur, it does not tarnish metals.

The polymerization of chloroprene also occurs very rapidly in aqueous emulsion. The resulting product constitutes a synthetic vulcanized latex which has much smaller particle size than natural latex. Upon evaporation of the water, the particles coalesce much the same as do the particles of vulcanized natural latex, and the resultant rubber has properties similar to those of the elastic polymer obtained by the spontaneous polymerization of chloroprene in the absence of water, or by the vulcanization of the plastic polymer. Because of the small particle size the new synthetic latex impregnates many porous materials that cannot be impregnated with natural rubber latex. Chloroprene can also be polymerized in the pores of bibulous or porous materials, thus intimately impregnating them with synthetic rubber.

Although the cost of production of Duprene will be many times greater than the present market price of natural rubber, it is nevertheless believed that many commercial uses will be found for it because of its unique properties.

Distribution of Sales, 1929

of the

Manufacturing Plants in the Tire and Tube Industry

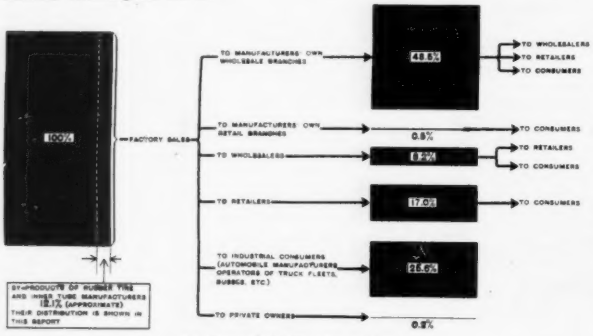
SALES to manufacturers' own wholesale branches make up nearly one-half the sales by manufacturing plants engaged primarily in making rubber tires and inner tubes. Data collected for the Census of Distribution[1] show that of the total sales by these plants in 1929, amounting to $770,177,000, 48.5 per cent, or $373,314,000, was sold in this way.

The remaining sales were made as follows: to industrial consumers, such as automobile manufacturers, operators of truck fleets, busses, etc., 25.6 per cent, or $197,383,000; to retailers, 17 per cent, or $131,207,000; to wholesalers, 8.2 per cent, or $62,939,000; to manufacturers' own retail branches, .5 per cent, or $4,136,000; and direct to private owners, .2 per cent, or $1,198,000.

Of the above sales to dealers and industrial consumers $15,426,000 was made through manufacturers' agents, selling agents, brokers, or commission houses. Eleven manufacturing plants sold through such agents, 5 of them selling their entire output in this way.

This report shows the sales channels used by the 91 manufacturing plants which are engaged primarily in making pneumatic tires and inner tubes for automobiles, motorcycles, bicycles, etc.; and solid and cushion rubber tires for trucks and other vehicles. The sale of other products made by these plants, amounting to approximately $93,000,000, is also included in this report.

[1]Data from the United States Department of Commerce, Bureau of the Census, Washington, D. C.



Industrial Production

SUMMARY DISTRIBUTION OF SALES, 1929, BY MANUFACTURING PLANTS IN THE RUBBER TIRE AND INNER TUBE INDUSTRY

	Selling Value (F. o. b. Factory)	Percentage of Sales	Number of Plants: Total	Number of Plants: Selling Exclusively as Indicated
Total	$770,177,000	100.0	91*	..
Sales to manufacturers' own wholesale branches†	373,314,000	48.5	29	5
Sales to manufacturers' own retail branches	4,136,000	0.5	13	..
Sales to Dealers				
Wholesale	62,939,000	8.2	42	12
Retail	131,207,000	17.0	54	16
Sales to Consumers				
Industrial (automobile manufacturers, operators of truck fleets, buses, etc.)	197,383,000	25.6	33	..
Private owners	1,198,000	0.2	9	..

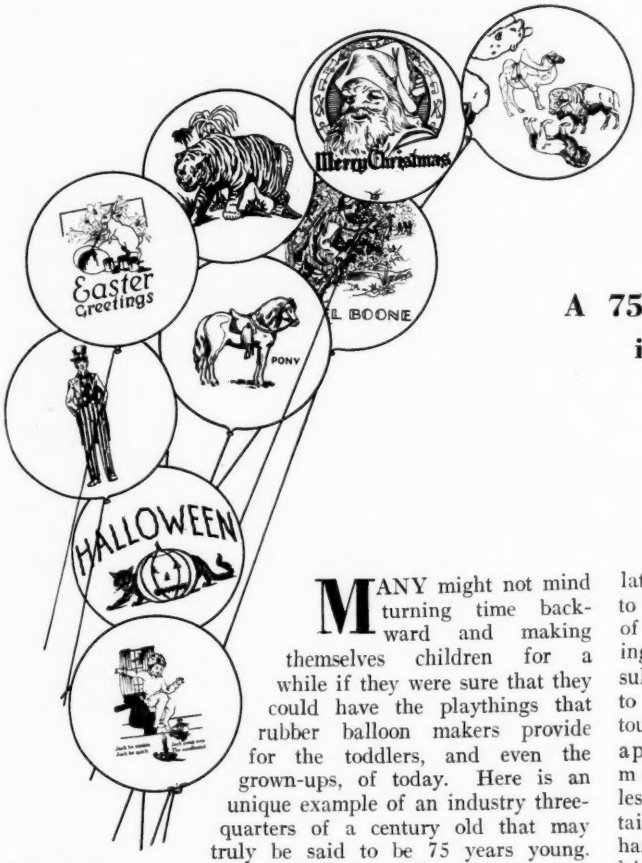
Of the above sales to dealers and industrial consumers $15,426,000 was made through manufacturers' agents, selling agents, brokers, or commission houses by 11 manufacturing plants, 5 of which sold their entire output in this way.

*The total number of manufacturing plants engaged primarily in the manufacture of rubber tires and inner tubes is 91. Inasmuch as some plants sell to more than one type of customer, this figure is less than the total of the figures shown below it.

†This report does not show the sales by manufacturers' own wholesale branches to dealers or industrial consumers.

Toy Balloon Making Lively

A 75-Year-Old Industry Prospers in Catering to the Spirit of Youth—Artistic, Ingenious Creations That Spur Fun, Teach Toddlers, and Liven Trade



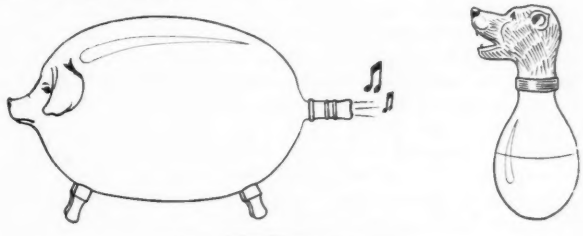
MANY might not mind turning time backward and making themselves children for a while if they were sure that they could have the playthings that rubber balloon makers provide for the toddlers, and even the grown-ups, of today. Here is an unique example of an industry three-quarters of a century old that may truly be said to be 75 years young. It keeps thus and prospers because it gratifies the desires of youth and grown-ups as expressed in the age-old spirit of carnival. At the same time it serves practical ends by affording one of the most sought-for and effective media of advertising.

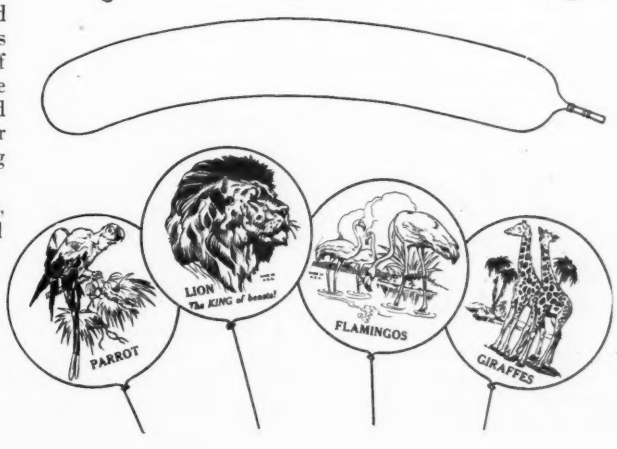
Although quality of products has been much improved, variety greatly increased, attractiveness immeasurably enhanced, and many refinements introduced in the making of balloons, the art itself has undergone few radical changes since its inception, about 1856. The balloons are still produced by dipping globular or other forms from three to a dozen times or more into a rubber cement, which may be tinted or uncolored pure or compounded gum, and by evaporating the naphtha or other solvent used. When the desired thickness is obtained, the balloon is either rolled off its form by hand or removed with a jet of compressed air. Of course many balloons are made at one time by affixing the forms to slowly turning circular frames that, having dipped a row of forms into the cement, lift them to dry, while other rows follow continuously in the immersing and drying process.

Cold-curing, as with sulphur chloride vapor, testing, printing, or painting, and attaching mouthpieces follow, and as much as 8 hours may be consumed in perfecting a balloon that sells for a trifling price.

Latex Balloon Experiments

Since the making of balloons involves first the preparation of cement, requiring the coagulation of latex, the drying and sheeting of the coagulated rubber, and the latter's liquefaction in a solvent, manufacturers have sought to make balloons as efficiently through the simpler process of dipping molds directly into the original rubber milk, drying each coating, and then vulcanizing the products. Results obtained so far, however, with simple latex are said to be not very reassuring. The balloons produced are quite tough as compared with those made from cement; they can apparently be made at even less cost and certainly with less hazard, and their high tensile strength makes a strong appeal. The trouble with





NOTE. Illustrations by The Pioneer Rubber Co., Willard, O.

them, experimenters report, is that they are much harder to inflate, and in the curing the dyes fade out much faster than in balloons made from ordinary cement. Still research workers hope to get colors that will better resist the blanching effect of the sulphur in curing.

Balloons are tinted and decorated beautifully, even in the cheaper grades, by means of an air-brush carrying colored dyestuffs and inserted within the inflated products. Agate, aurora borealis, and marbleized effects, rainbows, sunset shades, pastel and vivid splashes are produced in almost endless variety, the thin gum adding sheen and transparency. The printing on the outside is done by hand with a special ink on a rubber stamp while the balloons are semi-inflated. A girl, working at moderate speed, can stamp 3,000 or more a day. After stamping, the balloons are deflated and packed in strawboard cartons. Rarely does a buyer request that they be shipped blown up, but a Midwest manufacturer received one such request lately.

Some Types and Uses

In seemingly endless variety are the patterns and the purposes of balloons. There are round ones inflatable from 5 to 44 inches or more, airship balloons ranging from 3 by 14 to 7 by 28 inches, cucumber shapes up to 8 inches by 7 feet, lung testers graduated in cubic inches, rugby footballs, watermelons, grotesque faces, Old Black Joes, negro mammies, fowl, animals, soldiers, sailors, tumbling clowns that right themselves, squealing pigs, etc.

Squawkers are in considerable demand. Heretofore the noise has been produced solely by tying a narrow rubber band over the inner end of the wood mouthpiece, or inserting a small split reed; but now a more lasting din-maker has an all-metal vibrating section put in the mouthpiece. "Twistit" wood valves holding the air until released; China reed sticks and balloon bellows are accessories.

Balloons are especially valued for advertising. Thus in promoting the recent Fiesta de Los Angeles, September 6 to 12, celebrating the 150th anniversary of the settlement by the Spanish of the Southwest city, the merchants and fiesta committee are said to have used 50,000. They were air-brushed within with the Spanish colors, red, green, and yellow. Circus companies find balloons indispensable; a Mardi Gras or a Hallowe'en celebration would be incomplete without them. On them children are shown many pictures, mottoes, and other educational matter. The frolics attending national and other meets of societies and political parties are enlivened with balloons bearing appropriate emblems, slogans, or insignias.

Gasoline companies are large users of balloons; big baking concerns often set thousands of them adrift, every 25th marked "good for one loaf," while other large consumers of the festive baubles are candy, beverage, toy, and furniture manufacturers, motion picture theatres, department stores, tire dealers, and instalment houses.

Heveatex Products

(*Continued from page 52*)

paper fiber when exposed to sunlight. Great progress has been made in this direction, however, so that latex papers are now being manufactured which have first class aging properties.

In the field of cements these products are rapidly making inroads into the territory of the old naphtha cements, not only on account of better results and elimination of fire risks but also through greatly lowered costs.

Shower bath curtains which stand boiling water and are remarkably long lived are also being made from a special latex composition.

"Backing" rugs and pile fabrics are another field in which highly successful developments have occurred. Even certain types of chewing gum are now being made from processed latex, and some remarkable new uses are at present in the state of development which were, a few years ago, undreamed of.

In general these products prepared, as they are under expert supervision, have enabled manufacturers to produce new articles or improve their old processes which, as a result, have proved highly remunerative.

Basic Causes of Accidents

THE basic causes of accidents were recently discussed before the Rubber Section of the National Safety Council[1]. The author pointed out that to determine the basic cause of an accident the conditions and the operations involved in the accident should be investigated. It is only by determining basic causes that ways and means can be instituted to prevent the recurrence of accidents.

In accident statistics it is common to find types designated as causes. The type of an accident is not always the cause. Statistics mean very little when expressed in percentages of falls, and of machinery accidents. They mean much more when classified by causes, as for examples, inexperience, lack of mechanical safeguards, lack of instructions, or something which is a direct cause of an accident. The author does not advocate the abandonment of accidents by types, for it is valuable to know what accidents are classified as burns, falls, explosions, and infections. It is important to know the cause of the accident as distinguished from the cause of the injury. Probably 90 per cent of industrial accidents are attributable to preventable basic causes.

The following tabulation shows the steps that probably would have prevented the mishaps, together with the percentage of cases:

	Per Cent
Discipline	17.68
Instruction on safety methods of working	15.12
Warnings to be more careful	12.38
Enforcement of safety rules	11.69
Improved inspection methods	8.42
Changed or new tools or equipment	7.05
Additional personal safe equipment	6.00
Additional safeguards	4.64
Change in methods of doing work	4.47
Change in plant layout	3.94
Safety education	3.09
Physical examinations	2.23
More suitable work for employe	1.55
General discussion at safety meetings	1.03
Closer supervision of details of work	.35
Enactment of new safety rules	.18
Clean-up of plant	.18
	100

A recent survey of the basic causes of all the lost-time accidents in two large rubber factories revealed that at each plant the majority of causes were the same. The greatest number of accidents was due to disobedience of instructions. Next came poor judgment, then unsafe practices, and haste.

Accident prevention, to accomplish the desired results, must have the whole-hearted support of the entire organization, and the management must be willing to back its good intentions financially without quibbling over minor expenditures. Safety is not a one-man job. The success of the work can best be measured by the number of people who are cooperating and if the safety director is wise, he will stay in the background as much as possible and stimulate the interest of those who are on the firing lines, and in a position to put the thing across. He should by all means give credit for results to his helpers as the good work will be reflected through the efforts of his associates.

[1] Paper by Ernest W. Beck, supervisor of safety, United States Rubber Co., Passaic, N. J., presented before the Rubber Section, National Safety Council, Chicago, Ill., Oct. 12-16, 1931.

The Silent Servant

Rubber in the Kitchen

THE modern housewife owes a debt of gratitude to Rubber, for Rubber is her helper, one that makes her burdens less, her tasks lighter.

Opportunities for employing rubber in the kitchen are limitless because this material ideally fills innumerable needs. It is attractive, yet utilitarian. Easy to clean, it meets the exacting requirements of an immaculate kitchen. Rubber is long wearing and, consequently, inexpensive in the end. In many ways it saves wear and tear on the housewife's hands and her clothes, kitchen utensils, crockery, furniture, floors, and walls.

Goodyear Tire & Rubber Co.

Consider first the floors. No place is more suitable for rubber flooring than the kitchen. Such a covering is sanitary, non-absorbing, noiseless, and soft under foot. Rubber flooring retains its original beauty for years without any repairs or refinishing of any kind except ordinary cleaning with soap and water. The material can be laid on wood or concrete or on old dried-up floors such as are found in old frame houses. If a building settles, the rubber flooring will not crack. Hot grease and fruit stains will not spot it, nor will table or chair legs mar its lovely finish. Such flooring is available in several hues and patterns designed to harmonize with the color scheme of any kitchen.

Then, too, attractive wainscotting to match the flooring may be had, as well as scatter rugs and mats.

These mats in innumerable styles, colors, and patterns suit many purposes, especially where rubber flooring is not used. Corrugated circular mats under refuse cans save floors. Rubber mats outside the kitchen door and in the pantry, before ice boxes and sinks and tubs guard the floors also from the delivery boy's rude feet. In places about the kitchen where most work is done, rugs and mats ease the strain on the housewife's tired feet as well as protect the floors from water or food stains and footwear and furniture marks.

Kneeling pads of hard or sponge rubber, as the name suggests, are designed to remove the threat of housemaid's knees.

As a protector of fine surfaces rubber is second to none. Rubber table top material can find many chances for service in the kitchen on tables, low cabinets, shelves, etc. In one form a piece of rubber about 6 inches long fits over the edge and extends a few inches on the top and the bottom of the table top in a secure grip. Thus the housewife, without injury to the table, may clamp on to this rubber protector food grinder, can opener, or other device with metal clamps, easily, quickly, and firmly, avoiding mars, cracks, slipping, sliding, and other annoyances. Hot dish mats to overcome scorching may also be had of rubber in sundry sizes and shapes.

Door push plates and kick plates of molded and reenforced rubber are attached to doors by ordinary commercial cement. The rubber, outwearing the wood, protects those portions of the door subjected to rough and constant usage from hands and feet. Caster cups under ice boxes, gas stoves, radiators, and other articles of household equipment shield flooring from marks by the casters. Chair tips serve a similar purpose. The preferable arrangement, of course, is the use of casters with solid rubber wheels.

Rubber in many forms efficiently aids in the preparation of meals. A popular food mixer and juice extractor boasts rubberized cord, rubber feet to prevent slipping, and a rubber mat. Every housewife is familiar with rubber rings to help seal preserving jars. Another device, to shell peas and fresh lima beans, has rubber rollers to do the work; while vacuum cups hold the machine in place on any convenient spot. Suction cups, incidentally, appear on a variety of kitchen accessories to hold them securely without danger of slippage or spilling or marring of surfaces.

More and more are electrical refrigerators coming to the fore. How many now offer as standard equipment rubber instead of metal trays for ice cubes. The rubber trays have marked advantages over the metal ones. The former, since they are flexible, easily release the ice cubes. Nor do the rubber trays stick. Metal ones do. Because many such refrigerators still have metal trays, an ice tray remover has been perfected that utilizes rubber in the form of a shock absorber on one end.

For the unwelcome task of dishwashing rubber again comes to the rescue. One mechanical dishwasher features rubber washers and hose in its makeup. For cleaning plates and sinks a scraper is available with a wooden handle to which is attached a rubber blade to do the cleaning. Then there is the all-rubber scraper with handle and blade of one piece.

Nearly every housewife knows the steel wool pads for scouring pots and pans. This steel wool, although excellent for kitchenware, is not so good for lovely hands. Many holders, in consequence, have been designed to protect these hands. Rubber, naturally, was readily recognized as an ideal material for this purpose. In one instance a circular section of rubber is laid on top of the scouring pad and held in place by a small wooden knob, which acts also as a handle. Another such device of rubber consists of a ferrule shaped handle atop an octagonal section of rubber to which the pad is attached by rustless steel points which settle back in grooves of the holder so that they cannot scratch any sur-

faces. To complete the set is a flexible rubber cup in which may be put the holder with the steel wool and a square piece of soap when all are not in use. Another, more novel holder is cylindrical in shape. The steel wool is encircled by the rubber, which is attached also to the wooden cap. As the steel wool wears down to the rubber, all the user need do is peel off a strip of rubber to allow a portion of the remaining scouring material to become free. Convenient tabs and strips perforated in the rubber make peeling easy. Drainholes in the wooden top allow the scouring unit itself to be readily cleaned.

Drainboard mats with their corrugated exteriors prevent dishes from slipping. Such mats eliminate noise and breakage. They serve also to prevent puddles of water from accumulating with their resulting damage.

The market is also flooded with soap dishes, either of sponge or hard rubber. They are non-breakable, noiseless, easy to clean, and more attractive than metal or china ware; so they are becoming increasingly popular. In solid pastel shades and mottled and two-tone effects these rubber dishes will match the color scheme of the most up-to-date kitchen.

General utility household sponges likewise are blessings in disguise. They are excellent for cleaning wall paper, wall finishes, hardwood and tile floors, linoleum, shades, upholstered furniture, screens, windows, bath tubs, painted surfaces, etc., and may be used wet or dry depending upon the service to which the sponge is to be put. To allow the user to reach high spots some of these rubber sponges are cleverly attached to long wooden handles.

Plumbing commands a goodly share of rubber. Rubber basin stoppers are a rarity in no home today. The new type of sink in the modern kitchen makes good use of rubber stoppers large enough to fit over the drainage holes in the center of the sink. On the market now even appears a combination soap dish and sink stopper which can satisfactorily fill either role. Sink gaskets of rubber have long been utilized. A hard rubber device over the faucet keeps the water from splashing and a somewhat similar device acts as a water filter. How many an unseen rubber washer is responsible for good service from the kitchen piping? Rubber elbows, moreover, connect awkward joints. Tubing in all sizes, either plain or corrugated, comes with light, medium, or heavy wall.

Other uses of rubber, some scarcely noticeable because they perform their tasks so efficiently and quietly, may be found in the up-to-date kitchen. To realize their importance try to visualize the room without them. There are insulated wires for lights, toasters, vacuum cleaners, and electric irons. How about hard rubber plugs? Rubber topped tacks and screws likewise are put to serviceable uses. Stepladder and trestle shoes have prevented many an accident; while solid rubber door and window wedges check doors and windows from swinging or rattling with resulting damage.

Another unusual role for rubber is to keep candles from falling out of their sticks. Often the candle does not fit perfectly; so a rubber cap, which fits exactly into the holder, is used. The candle then is placed into the rubber fitter to stand upright in the holder. Rubber corks come in an assortment of sizes to fit any kind of bottle. As carpet sweepers still are used, a demand exists for tires for them. While rubber belts, tires, and parts constantly are needed for vacuum cleaners. Even the rubber fly swatter has made a successful debut. Most of these various rubber accessories, of course, are available in all popular shades.

Now for the woman who works about the kitchen. What else does Rubber do for her personally? Its greatest service here is protection. Every woman who cherishes the appearance and the comfort of her hands welcomes household gloves to be worn while she is engaged in her more arduous duties. These rubber gloves come in several sizes and fashionable hues. The apron, too, saves milady's dress from damage. Of all rubber or rubberized fabrics these aprons boast a variety of styles in a wide array of attractive colors and patterns to suit the taste of every woman.

A host of other rubber articles in the kitchen clamor for recognition, but neither time nor space permits of their mention.

Yet after this survey can you not fully realize that Rubber is a most dependable aid to the housewife, doing its tasks silently and well?

Inspection of Rubber Machinery and Equipment[1]

THE principal reason for a definite and periodic inspection of machinery and equipment is to detect faults not ordinarily observed and to insure safe operation of such machinery and equipment within reasonable limits.

Stopping limits of prime movers and their appurtenances are closely associated with the condition in which a machine is maintained.

To guard against machine hour loss and to insure quality production, it is essential in some cases to inspect machinery and equipment while in motion, to determine by sound and feel whether or not it is in good condition. In such cases from the viewpoint of safety the method of inspection and control exercised is most important and requires careful and logical planning.

Wherever possible, new equipment, if carefully designed, provides for greater and safer accessibility and often obviates the necessity for working on machinery in motion.

In shut-down periods or when machines are at rest, however, due precaution should be used in locking out main or auxiliary switches if independent, or by the substitution of warning cards hung on switch handles.

Wherever possible, centralized control of machinery, tools, and equipment is decidedly advantageous for the reason that a unified control eliminates any divided responsibility.

The question of the part the safety division plays in this subject is and always will be debatable. However, from the viewpoint of experience the method must, as in many other cases, lend itself largely to the facilities provided in each case.

The personal opinion of the author is that more effective safety inspection can be accomplished by delegating responsibility to the field engineer and production groups, the safety department always receiving reports of such inspections and joining in the discussion and conference of the subjects at hand.

Safety meetings are partially taken up by an inspection of machinery and equipment in which the department to be inspected is not assigned until conference time, and the safety director and all general foremen of the division themselves make the inspection; then the findings are a part of the minutes of the safety meeting. The follow-up is then made by the foremen involved and checked by the safety director.

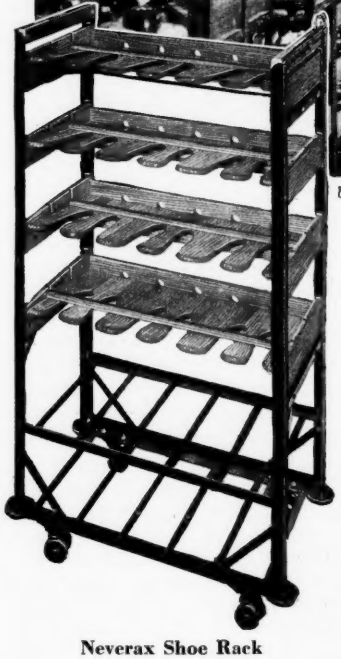
[1] Paper by W. L. Schneider, safety director, The B. F. Goodrich Co., Akron, O. Presented before the Rubber Section, National Safety Council, Chicago, Ill., Oct. 12-16, 1931.

Developments in Footwear Manufacture

H. R. Polleys[1]

United Shoe Machinery Corp.

Unit Machines—Leather Shoe Industry



Neverax Shoe Rack

U. S. Training Service

Making Bench of an Old Time Footwear Plant

THE rubber footwear manufacturing industry has been with few exceptions until comparatively recent years a highly skilled, hand labored business. The mill room of necessity has demanded heavy equipment but in practically all other departments hand labor was utilized, and a single individual assembled all the component parts of a shoe during the actual making.

The manufacture of both rubber and canvas footwear has undergone the greatest change in its entire making history within the last few years. Tires by way of contrast are of a more recent school of manufacturing. At the time when they began to be produced in large quantities the methods of leading motor car manufacturers had already found their way into tire plants, and mechanical conveying systems were put into use in every possible instance. Tubers extruded onto gravity rollers, and tires in the process of completion were conveyed from department to department. In general an up-to-date method of quantity production was thus adopted. Tradition as embodied in the old time individual bench method worker has never held the tire branch of the industry in such a deep rut as its ally, footwear.

The writer recalls many interesting problems which have arisen because of the mechanization of the footwear and the

United Shoe Machinery Corp.

Outsole Pressing Machine

[1] Development Engineer.

mechanical goods branches of the rubber industry. Ten years ago if one visited almost any of the leather shoe plants in this country, the differences in manufacturing methods were outstanding. In a rubber footwear factory one saw thousands of pairs of rubber and canvas footwear products made by hand with row after row of individual shoemakers' benches spread out over the floors, each worker turning out approximately 35 pairs daily, completely finished except for varnishing. Rubber shoe workers were lasting the linings, placing the heel and toe pieces, trimming with foxing, cementing, uppering, skiving, placing, and hand rolling outsoles along with the many other necessary operations for their preparation.

Leather shoes on the other hand were neatly stored on peg rack trucks. Each operation of their assembly was subdivided so that practically an unlimited supply of work might be given each operator in the broken down chain of operations. Material necessary for successive operations was in many cases stored on the same rack as the shoes, and various machine stations were located in a progressive manner around the making rooms where a worker forced his machine to its greatest degree of efficiency. Rack after rack of shoes in process were drawn alongside each making machine as their operators checked the tickets and rushed 24 shoes through their cycle. Shoes were replaced on the movable rack with lightening rapidity one by one after the operation had been mechanically performed, and the rack was then given a push down the assembly line where the next operator in the chain went through the same procedure to add his quota.

Contrast in Methods

Contrasting the above general plan of manufacture with the production methods of rubber footwear, it was a distinct step ahead when mechanical development was intensely launched in order that the so-called bench method and allied operations could be abandoned for a more modern and cheaper manufacturing system. The racking together of lots of 24 pairs of shoes was undertaken as the first big change in making methods in many years at the same time that mechanical development for the basic operations was started. In many respects the manufacturers faced a difficult problem as with few exceptions the unit machinery so very necessary to these newer methods was non-existent.

Machine Lasting

Fabric shoe lasting with the individual method was entirely a hand work operation. Mechanically this step in manufacture presented many problems. Altered leather shoe machinery was used by some manufacturers, and much experimenting took place with the result that very efficient mechanical methods became evolved. Proper machine lasting today gives a tightness over the vamp which rivals hand work; while tops are firmly secured to insoles under mechanical pressure far greater than it was possible for the individual worker to allot each of the 70 odd shoes on his daily ticket.

Outsole Pressing

Another important unit machine development was the mechanical pressing of uncured calendered outsoles to the shoe. This operation, as individually performed, had heretofore been completed with the very fatiguing use of a small metal hand propelled roller. This hand rolling of outsoles had always presented a quality hazard, and it takes little imagination to picture the varying degrees of adhesion which resulted from such an antiquated method. Loose outsoles, air blisters, and in many cases little or no adhesion throughout the central portion of the sole resulted. Careless or tired workers were being entrusted with an operation which was of vital importance to the useful foot mileage obtainable. The development of the unit outsole pressing machine and its adoption by the industry has practically eliminated all trouble with loose outsoles. Many types of machines are in use which have been developed by the manufacturers themselves, and one particularly efficient commercial machine is available for the industry as a whole. Savings from the use of these machines are considerable, and a single operator can easily press thousands of outsoles daily.[2] A machine never tires; and even though the operator becomes careless, the machines are practically foolproof and usually turn out adequate pressing under the worst servicing conditions.

Cementing for Foxings

Still another making operation which particularly in the case of tennis shoes had always required each worker to possess almost artistic ability in its exactness was the rubber cementing of fabric tops preparatory to receiving the trim such as rubber foxings and certain types of toe caps. This operation was generally performed with a special brush, and shoes were held in one hand while with the other the worker carefully cemented or marked the top with as even a line as possible. It took many weeks of careful supervision to train workers for this type of cementing, and in no case was it ever possible for any two shoes to have a clean cut foxing line exactly alike in appearance or height. When individual bench making of shoes became obsolete, a machine for performing this operation was in great demand; and its development has brought forth many solutions which have been patented from time to time.

The field of commercial machines available for this operation was also practically non-existent; and as there was no background of old style machines from which to gain experience in design, the problem was difficult. Various attempts had been made to supply the worker with trick cement cans, special brushes, drainage tables, etc., so as to speed up production, but it had never become a mechanical operation until newer methods of shoe making forced its invention.

Machinery for handling rubber cement requires many special features, and its design can be based only on actual experiments made with the particular cement to be used and under actual working conditions. Rubber cement at best is most difficult to keep at a uniform viscosity, and it has a very annoying habit of settling out at the wrong time so as to interfere with uniform feeding. Mechanically its use presents further problems such as interference with lubrication of moving members and the breaking down of rubber parts incorporated in the design should they come in contact with the cement under continued use.

In patented marking machinery it can readily be seen that their inventors had in mind the need of a uniformly high, clear cut foxing line which would permit easy and accurate placing of the rubber trim to give a more finished appearance to the shoe. Many feel that machines now available for this work are still far from being the ultimate solution of this difficult making operation.

Machines of the Future

Rubber machinery in future years will most certainly rival those in the metal industries for their human ability uncannily to duplicate hand operations now requiring the greatest dexterity. Hand workers are everywhere being replaced by robots, but at the same time one must remember that repairs and maintenance, to say nothing of the development of such devices, require more and more the services of a highly trained technical staff to make certain each unit is in fit condition to perform its daily task. Increased machine installation creates automatically an increased de-

[2] See India Rubber World, June 1, 1924, pp. 581-82; Oct. 1, 1924, pp. 5-6, for cost comparisons.

mand for technical labor whether it be skilled or unskilled labor.

The field of mechanical development which is now producing many new and intricate machines for the footwear industry may be likened to a forest of young, untapped rubber trees. Both are about ready for productive use, and no one can predict to what extent future rubber footwear will be influenced by their absorption into the industry. The swing from individual complete bench making to methods more closely following the bracketed rack truck methods using the unit assembling machines such as the leather shoe industry employs, is only one of the steps through which making methods are progressing. Many improvements seeking to eliminate unnecessary handling of the lasts at each successive operation have since been developed as an aid to obtaining the greatest efficiency from the unit machine.

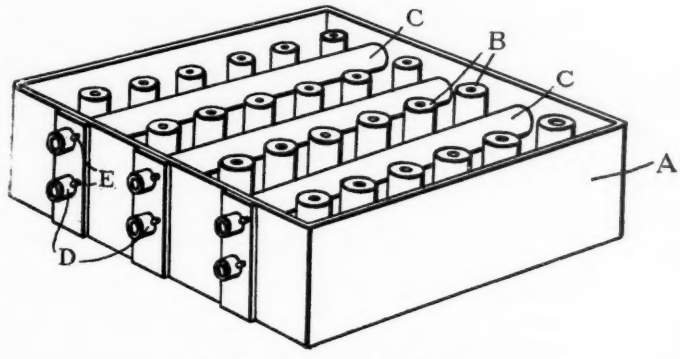
The writer predicts that latex which at present is seldom used in the manufacture of footwear will command greater respect as time passes and that as it is a liquid and may be handled as such, new and startling developments in its use will require highly specialized machinery of the hydraulic type. Its possibilities for eliminating a large number of unit machines in the manufacturing chain are unlimited.

The producing of rubber footwear mechanically is surely coming into its own, and competition of the future will become a very serious menace to the producer who fails to keep informed and equip his plant with new mechanical devices which can be shown by a careful analysis of conditions to lower the cost of his particular product.

Latex Sponge Rubber

The Compounded Rubber Is Whipped to a Froth, Poured Into Molds, and Vulcanized

THE application of sponge rubber in a variety of new products is of much practical interest. The story recently published in this journal[1] mentioned the manufacture of sponge rubber from latex whipped into a froth and poured into molds. The following are the details of this process[2].



Mold for Latex Froth Sponge

Latex having the following composition is prepared and concentrated without coagulation while it is in constant motion.

	Parts by Weight
Rubber	100
Sulphur	3
Zinc diethyldithiocarbamate	0.7
Mineral oil	5.0
Caustic potash	0.4
Casein	0.1
Oleic acid	0.5

The above ingredients are in the form of a latex cream sufficiently viscous and concentrated to prevent the segregation of the compounding ingredients. Two parts by weight of sodium silicofluoride based on the dry mixing are added and the mass is then whipped for a few minutes by whipping machines which action converts the mass into a frothy condition. One half part of zinc oxide is added as a dispersion, preferably being dispersed with casein. The froth thus obtained is then placed in a metal mold provided with heating elements, and permitted to gel at normal atmospheric temperature (16° C.) or (50 or 60° C.). The gelling will occur in about 30 min. The mold is then placed in an autoclave and vulcanization carried out for one hour with steam at a pressure of 5 lbs. If hollow internal heating tubes are employed, the steam will uniformly vulcanize the mass within the mold. The molded material is then removed from the mold and dried.

Referring to the illustration, mold A is provided with a removable cover and with 4 rows of 6 vertical heating tubes B, and with 3 rows of 2 horizontal tubes C. All of the tubes B extend parallel from top to bottom of the mold and are of uniform cross section so that the rubber article may be removed lengthwise of these tubes without distortion. The heating tubes C also extend parallel from one end or side of the mold to the other and are of uniform cross section so that they may be withdrawn without disturbing the molded material.

The heating tubes B fit loosely over tubes fixed into the bottom of the mold. The heating devices C consist of thin outer tubes equal in length to the inside length of the mold and fitting loosely over inner tubes D. The tubes C project through the mold and are held in position by cotter pins E in the projecting parts outside of the mold. The thin outer tubes of the heating elements C may be made of metal and withdrawn from the mold or they may be of rubber and remain in the article, the inner devices C only being withdrawn. The tubes D are open at both ends so that steam may circulate in the interior of the mold and effect uniform vulcanization.

After the material in the mold has gelled and vulcanized the article is removed from the mold without distortion by removing the cotter pins E and sliding the tubes D out of the mold.

To afford additional support to the sponge material during the setting and the vulcanizing, layers of woven fabric may be provided within the material in the mold. Such supporting reenforcements may remain after vulcanization and may serve as reenforcing components of the finished articles.

[1] "Rubber Upholstery," Sept. 1, 1931, pp. 65-67.
[2] U. S. Patent No. 1,828,481, Oct. 20, 1931.

Distributers' Tire Stocks

In the United States as of October 1, 1931[1]

THIS report covers stocks of tires held by both independent dealers and mass distributers. Returns from these two groups are discussed separately below.

Independent Dealers' Stocks

The regular semi-annual survey of tire stocks in hands of dealers, conducted since 1924 by the Rubber Division, shows the following comparable statistics, as of October 1, for stocks held by independent retailers in 1931 as against 1930. The number of reports received from dealers having stocks of casings was 4,640 less than in October, 1930. The average number of automobile casings per dealer was 60.2 on October 1, 1931, compared with 62.4 a year previous. A limited number of dealers treated below under the caption of mass distributers were in 1930 included as independent dealers; it is believed that total stocks of casings in hands of independent dealers are now practically unchanged from October, 1930. Stocks of inner tubes and solid tires averaged definitely lower than in 1930, indicating a reduction during the past year in dealers' stocks of these items.

High pressure casings, including both passenger car and truck sizes, which accounted for 17.37 per cent of total stocks reported October 1, 1930, amounted to only 13.09 per cent of the total reported this year.

Table I compares average stocks per dealer reporting each item on October 1 in the years 1924 to 1931, inclusive.

The average stock of casings per dealer increased, except in 1926, from 1924 to 1929, since when they have declined. The average stock of inner tubes began to decline a year earlier than for casings, and the contraction has been more pronounced; current dealers' stocks of inner tubes average nearly the same as in 1924, but the current ratio of tubes to casings is much lower than in 1924. Stocks of solid and cushion tires have shown a gradual downward trend throughout the entire period. The decline in casings average stocks since 1929 is natural in view of the lower volume of renewal tire sales in the past two years, and the even greater decline in inner tube average stocks is following the reduced ratio of inner tube sales compared with casings sales.

Dealers' Stocks of Automobile Tires

	October 1, 1930			October 1, 1931		
	Number	Dealers Reporting	Average per Dealer	Number	Dealers Reporting	Average per Dealer
Total casings	1,965,728	31,522	62.4	1,617,366	26,862	60.2
High pressure casings	341,760	23,564	14.5	211,824	18,741	11.3
Inner tubes	2,819,631	31,624	89.2	2,185,505	27,062	80.8
Solids, etc.	32,775	1,443	22.7	20,947	1,096	19.1

Dealers' Stocks of Automobile Tires by States, October 1, 1931

	Total Casings			Inner Tubes			Solids and Cushions		High Pressure Casings	
	No. of Dealers Reporting	No. of Tires on Hand	Average No. per Dealer	No. of Dealers Reporting	No. of Tubes on Hand	Average No. per Dealer	No. of Dealers Reporting	No. of Tires on Hand	No. of Dealers Reporting	No. of Tires on Hand
New England										
Maine	366	13,926	39.1	368	18,570	51.9	8	108	258	2,104
New Hampshire	188	8,627	48.9	182	11,464	63.0	6	158	137	979
Vermont	161	8,904	59.0	151	10,829	71.7	2	19	102	2,159
Massachusetts	673	55,382	82.2	697	66,834	97.3	46	762	426	5,326
Rhode Island	119	8,240	69.2	125	10,143	81.1	3	26	75	832
Connecticut	270	17,046	63.1	269	21,879	81.3	17	233	169	1,894
	1,757	112,065	63.8	1,772	139,719	78.8	82	1,294	1,139	15,294
Middle Atlantic										
New York	1,709	118,452	69.3	1,702	171,472	100.7	100	3,064	1,137	13,129
New Jersey	523	30,278	57.9	535	38,558	72.1	23	1,208	295	3,031
Pennsylvania	2,268	124,377	54.8	2,293	155,302	67.7	112	1,674	1,388	13,858
	4,500	273,107	60.7	4,530	365,332	80.6	235	5,946	2,820	30,018
East North Central										
Ohio	1,494	78,283	52.4	1,506	100,219	66.5	55	730	996	9,167
Indiana	796	47,798	60.0	805	66,559	82.7	24	474	569	5,588
Illinois	1,396	87,763	62.9	1,390	123,198	88.6	58	920	1,010	11,607
Michigan	1,176	54,946	46.1	1,187	80,356	67.7	36	482	733	5,652
Wisconsin	1,011	54,330	53.7	1,006	74,806	74.4	29	622	769	8,036
	5,873	322,486	54.9	5,893	445,140	75.5	202	3,228	4,076	40,147
West North Central										
Minnesota	855	52,627	61.8	859	72,102	84.0	35	457	663	9,371
Iowa	915	41,719	45.6	915	61,373	67.1	31	627	595	5,891
Missouri	820	48,606	59.3	821	71,308	86.7	29	458	612	7,542
North Dakota	437	17,939	41.1	439	29,596	67.4	21	347	339	2,415
South Dakota	357	14,738	41.3	359	22,772	63.4	13	312	274	2,261
Nebraska	515	29,314	56.9	516	41,714	80.8	14	467	398	4,298
Kansas	699	43,310	62.0	697	59,918	86.0	19	140	580	4,770
	4,598	248,452	54.0	4,606	358,683	77.9	161	2,936	3,501	36,588
South Atlantic										
Delaware	49	3,381	69.0	47	4,096	87.1	2	14	33	386
Maryland	354	24,728	69.9	364	29,857	82.0	12	188	226	3,575
Dist. of Col.	56	5,744	102.3	57	6,864	120.4	3	27	20	366
Virginia	674	34,369	56.9	670	47,537	71.0	33	456	432	4,156
W. Virginia	375	21,861	58.3	371	20,940	56.4	18	262	227	2,756
No. Car.	428	26,830	62.7	433	30,578	70.6	20	216	298	4,207
So. Car.	250	12,362	49.4	261	20,835	79.8	5	34	176	1,516
Georgia	366	18,675	51.0	371	30,486	82.2	9	99	272	2,576
Florida	252	28,589	113.4	251	31,142	124.1	3	66	163	3,718
	2,804	180,560	64.4	2,825	222,335	78.7	105	1,373	1,866	23,770
East South Central										
Kentucky	369	17,890	48.5	372	27,450	73.8	18	189	345	2,378
Tennessee	317	16,158	51.0	326	24,888	76.8	22	335	236	1,946
Alabama	291	14,856	51.1	294	23,581	80.2	9	225	184	1,877
Mississippi	322	13,653	42.4	327	23,363	71.4	10	88	224	1,816
	1,299	62,557	48.2	1,318	99,282	75.3	59	837	881	7,917
West South Central										
Arkansas	277	14,068	50.8	282	20,136	71.4	8	80	184	1,816
Louisiana	255	14,976	58.7	258	24,887	96.5	4	14	175	1,968
Oklahoma	459	35,210	76.7	469	47,208	100.7	11	126	353	3,938
Texas	1,257	74,460	59.2	1,309	136,406	104.2	38	1,054	980	12,944
	2,248	138,706	61.7	2,318	228,637	98.6	61	1,274	1,692	20,656
Mountain										
Montana	271	16,589	61.2	267	20,040	75.1	12	104	201	1,897
Idaho	188	10,259	54.6	188	12,393	65.9	7	86	150	1,420
Wyoming	115	7,222	62.6	115	9,132	79.9	5	136	81	614
Colorado	359	25,764	71.8	368	33,129	90.0	19	197	255	3,822
New Mexico	148	6,931	46.8	146	9,423	64.5	9	160	105	886
Arizona	158	9,458	59.9	162	13,200	81.5	11	84	115	1,123
Utah	170	8,455	49.7	174	10,587	61.4	4	39	106	854
Nevada	57	3,369	59.1	57	4,774	83.8	3	143	37	391
	1,466	88,047	60.1	1,477	112,838	76.4	70	949	1,050	11,207
Pacific										
Washington	529	34,891	66.0	539	38,074	70.6	30	1,071	388	3,932
Oregon	397	21,078	71.0	389	25,835	89.4	16	431	220	3,151
California	1,335	117,948	88.4	1,320	130,163	98.6	56	1,177	969	16,013
	2,161	173,967	80.5	2,148	194,072	90.4	102	2,679	1,577	23,096
Unallocated	177	17,490	98.8	176	19,467	110.6	19	521	120	3,191
Total United States	36,883	1,617,366	60.2	27,062	2,185,505	80.8	1,096	20,947	18,741	211,824

Dealers' Stock by States

The average stock of automobile tires held by tire dealers in the United States on October 1, 1931, was 60.2, and the average number of inner tubes was 80.8. Comparing the average per dealer stock of casings by regions with results of the three peceding October 1 surveys indicates that cur-

[1]Special Circular No. 3,124, Rubber Division, United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C.

TABLE I

Average Stocks Per Dealer on October 1

	1924	1925	1926	1927	1928	1929	1930	1931
Total casings	53.6	56.6	49.9	57.6	64.8	68.4	62.4	60.2
Balloon casings	16.3	17.5	19.8	30.7	44.0	(a)	(a)	(a)
High pressure casings	(a)	(a)	(a)	(a)	(a)	22.9	14.5	11.3
Inner tubes	79.9	99.1	93.8	103.1	107.4	103.4	89.2	80.8
Solids, etc.	(b)	25.0	23.9	26.1	23.4	24.2	22.7	19.1

(a) Number of dealers not tabulated separately on survey indicated.
(b) Comparable statistics for 1924 not available.

rent October 1 stocks are relatively high in New England, the South Atlantic, and the Pacific States, and relatively low in East, South Central, and West South Central States. Inner tube stocks appear well in line with results of previous surveys, except that they are relatively low in the East South Central States this year. The conclusiveness of these indications might be affected to some extent by an abnormal number of returns from large dealers in some years from particular regions.

Dealers were asked to report whether they were handling one, two, three, or more makes of tires. An analysis of the reports shows a greater percentage of the dealers concentrating sales efforts on one make than in preceding years, although changes from 1930 were negligible. Less than 6 per cent of the dealers handle more than two makes now, as compared with 22 per cent in 1925.

Dealers Classified by Volume of Stock

An analysis by volume groups has been prepared of the reports from dealers having stocks of casings, and a comparison made to the survey of October 1, 1930. Generally speaking, this year a greater percentage of reports fell into the class of dealers having less than 25 casings in stock; a smaller percentage of reports fell into the classes of dealers having 25 casings or more in stock, with the exception of that class of dealers having 1,000 casings and over, whose percentage of total increased slightly from last year.

Over 77 per cent of the total reported stocks of casings held by independent dealers were in the hands of 26⅔ per cent of the dealers.

Analysis of Tire Dealers by Types of Business

The following specific questions were asked of all dealers reporting: (1) Do you sell automobiles? (2) Do you sell gasoline? (3) Do you sell batteries? It will be noted from the following analysis that the percentage of tire dealers selling automobiles, gasoline, and batteries increased from October 1, 1930.

TABLE II

	October 1, 1930		October 1, 1931	
	Number	Per Cent of Total	Number	Per Cent of Total
Total reports received	32,611	100.0	27,987	100.0
Sell automobiles	11,379	34.9	10,828	38.7
Sell gasoline	24,294	74.5	22,497	80.4
Sell batteries	21,296	65.3	20,172	72.1

The following questions also were asked independent dealers: (1) Do you have equipment for vulcanizing passenger car tires? (2) Do you have equipment for vulcanizing truck tires?

To the first question 3,916 dealers replied in the affirmative, 23,381 replied in the negative, and 690 made no reply.

To the second question 1,855 dealers replied in the affirmative, 24,491 in the negative, and 1,641 made no reply.

Mass Distributers' Stocks

In the survey of April 1, 1931, stocks of tires held by leading mass distributers were reported for the first time. That report covered stocks held by (a) the 2 principal mail-order houses and their chains of stores; (b) 2 supply companies merchandising special brand tires (one principally through its own stores, and the other principally through retail outlets of oil companies), and also a third independent chain system; and by (c) 3 tire manufacturing companies through chain-store systems operated or controlled by the companies. Under (c) reports included from 2 companies covered only stores reporting stocks of over 500 casings on April 1, 1931.

The report of the current survey covers similarly complete returns from identically the same distributers under (a) and (b), but an attempt was made to secure more complete information under (c), which this time covers reports, regardless of size of stocks, received from the 3 tire-company-controlled chains included last April, and in addition covers returns from stores operated by 5 other tire manufacturing companies, and stocks reported by a few stores operated by an oil distributing company. Complete figures of stocks held in retail outlets described under (c) were received from only 2 companies; if complete returns had been received from the remaining companies, and if the average stock per store had been the same as for the stores which did report for the same companies, total October 1 stocks shown below would have been increased by fully 400,000 casings and by an equal number of inner tubes.

With the above explanation as a basis, Table III shows the stocks reported by mass distributers April 1, 1931, and October 1, 1931.

TABLE III

	April 1, 1931	October 1, 1931
Total casings	1,402,115	1,987,284
Total inner tubes	1,547,586	1,847,440
Total solids, etc.	854	3,350
High pressure casings	47,000*	229,438†

*Incomplete figure, item not reported by several firms.
†Including estimate for one firm.

In the current survey as well as in the survey of April 1, reports were included from some tire manufacturers' stores which are included by the manufacturers in their returns to the Rubber Manufacturers' Association. The extent of such inclusion is not known exactly in the case of either survey, but as of October 1 the amount of stocks included above and also in the manufacturers' inventory as of September 30, 1931, is believed to have been 171,000 casings and 176,000 inner tubes, on the basis of information received from the manufacturers.

Summary

It is certain that mass distributers' stocks of casings and inner tubes were to some extent greater on October 1 than on April 1, and that as compared with October 1, 1930, the increase has been pronounced. Stocks held by independent retailers were practically the same October 1, 1931, as a year previous. The number of retail outlets, including those used by mass distributers with the independent retailers, is believed to be greater now than a year ago.

Rubber Soles and "Drawing"

THE rubber footwear trade still has to contend, although in decreasing degree, with the ancient objection that shoes with rubber soles "draw" the feet. The old type of rubber sole was often thus troublesome because, being usually of soft composition, it clung too closely to the foot. When the latter flexed, the sole bent too much with it, the shoe bottom failing to give a more or less bellows effect with the upper in drawing in and expelling air. With the latter-day rubber sole, made of a better compound, and yielding just enough to the spring in walking like a good quality leather sole, the old difficulty has been overcome. In other words the shoe with the modern rubber sole is as well ventilated as one with an all-leather sole, and the wearer gets added comfort and durability.

EDITORIALS

The Asiatic Peril

THE article, "Processing Estate Rubber," by George H. Carnahan, that appears in this issue brings out several points of timely interest to the American automotive, petroleum, and rubber industries whose continued existence depends in large measure on a dependable future supply of crude rubber.

The producer of standard plantation rubber should not be called upon to incur any expense that does not directly and positively add to the value of his product in the hands of the manufacturer, whose legitimate interest should be confined to the three factors of cleanliness, dryness, and uniformity of cure. In efforts to secure uniformity of color and appearance, together with the elimination of all gas bubbles and mildew, a lot of unnecessary money is spent that merely tends to induce curing irregularity and the sacrifice of valuable constituents of the latex. The necessity of adhering to worn out standards entails a serious cost handicap for the Caucasian as compared to the Asiatic, who disregards them—and gets away with it with only a nominal price penalty.

As a practical matter American manufacturers should carefully weigh the final effect of allowing the business of supplying them with rubber to become a monopoly of Asiatics, as many now fear it may. Sentiment aside, it is very sure that continuity of supplies at any price would be seriously jeopardized by the Asiatic's fatalistic attitude toward contagious plant diseases.

Serviceable Synthetic Rubber's Début

IT IS particularly gratifying to note one of the latest achievements of American research, development, and enterprise—a practical synthetic rubber obtained through the controlled polymerization of chloroprene, i.e., 2-chloro-1, 3-butadiene, the product to be marketed under the trade name of Duprene. Since the isolation of isoprene from caoutchouc over seventy years ago, chemists have been striving bravely to duplicate natural rubber through synthesis; yet despite the fact that they have often approximated it in composition and characteristics, their best efforts have up to the recent accomplishment fallen short of three prime requirements—adaptability to various practical uses, simplicity in processing, and moderate production cost. However, it now appears that in this new product those barriers have been fairly surmounted.

As might be inferred, the new synthetic rubber was not designed nor is it expected to compete with plantation crude in the major or in many of the minor manufactures, but that it will have important applications is obvious from the fact that it possesses primary properties of caoutchouc and some not inherent in the latter. Its unique qualities are likely to find for it commercial uses now unthought of, and even its early cost, which may now much exceed that of natural rubber, will, no doubt, be much reduced. Technologists have repeatedly expressed the need of some such material. It may fill an important rôle, too, in a national emergency since the raw materials, notably hydrogen chloride and acetylene, are so easily procurable.

A curious product is the new synthetic. Sulphur is not required to produce a fully vulcanized rubber from chloroprene; in fact its spontaneous polymerization speedily effects such a result. So, too, may the polymerization be halted at an intermediate point to allow usual compounding, and vulcanization resumed with but moderate heat. Not the least of the advantages ascribed to the new rubber are high resiliency; resistance to moisture, acids, oxygen, and most solvents, as well as softening by heat; and suitability for impregnating porous materials through its use as a synthetic vulcanized latex having smaller particle size than natural latex.

Dangers of Inflation

NOT more but better credit, it is argued, is what business needs to improve its condition. Many believe that business in the fore part of 1929 was in an ideal state, when the plain truth is that, while it was indeed brisk, it was fundamentally unsound, with too much spending, expansion, discounting, over-production, over-capitalization, and the piling up of debt rampant everywhere. The abnormal condition began to correct itself in the crash of security and realty prices, and the contraction of bank loans; and finally, when the limit of credit had been reached, the deflation began of prices of all sorts of commodities that had been recklessly overproduced.

Yet there are many clamoring, commonly debtors, for inflation of our monetary system through bi-metallism and other devices. When the value of the dollar is tampered with, a deadly blow is dealt to business. Either the standard of value is depreciated or credit increased without the addition of basis in value. Some, while conceding the faults of inflation, would condone it as a measure of temporary relief. But whether imposed on the country as a permanent policy or merely for the time being, the last stage of an inflationary boom is sure to be worse than its first. The slow but sure recovery may not suit the impatient Hotspurs, but it has at least the quality of durability.

What the Rubber Chemists Are Doing

Behavior of Rubber under Repeated Stresses[1]

W. L. Holt[2]

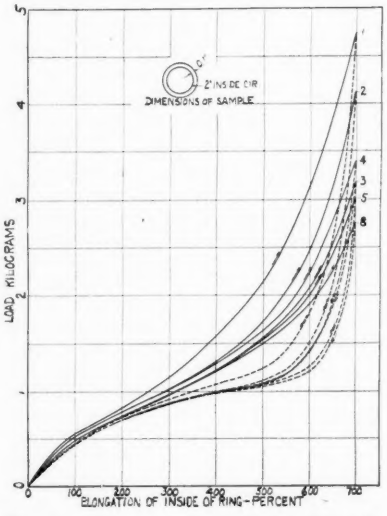


Fig. 1. Various Stress-Strain Records from One Sample of Pure Gum Rubber

IN THIS paper the author describes a simple and convenient apparatus for obtaining a graphical record of the tensile properties of rubber under a variety of conditions of repeated stressing. The way in which the stress-strain curve of a sample of rubber is affected by its previous strain history is illustrated in Figure 1.

These curves were derived by stretching the same sample of rubber to an elongation of 700 per cent and return 8 times. They were recorded in the order shown by the numerals. A brief rest period caused the apparent discrepancy in the location of curves 3 and 4. Two additional curves might have been recorded between 5 and 8 but were omitted to avoid confusion. The curves shown do not by any means represent the whole range of possible stress-strain curves from a given sample of rubber. A rubber which contains considerable compounding material is apt to show a much wider range, and, as will be shown later, consecutive strains of different values may produce quite unusual results.

Multiple-Cycle Stress-Strain Recorder

The apparatus used for making successive stress-strain determinations of samples of rubber compounds is illustrated in Figure 2.

The sample for test (usually ring-shaped) is placed around the pin grips at *A* and is stretched by movement of the slide *C*, which is actuated by crank *B*. The tension in the sample is transmitted through the calibrated spring *D* to the recording arm *H*. As crank *B* moves, causing the sample to stretch, crank *E*, by means of a flexible wire and rubber band *K*, causes recording plate *G* to move back and forth at right angles to the direction of tension, and thus point *H* traces a stress-strain record. Adjustment lever *F* is used to stop the movement of the recording plate when desired and also to adjust the position of the recording plate relative to the recording point.

A common speed of operation for the machine is 30 cycles per min. It may, however, be run as fast as 100 cycles per min. and, by the use of reduction gears, to as low a speed as desired. Suitable springs are provided so that the maximum capacity may be set at values between 2 and 20 kilograms. The length of stroke or the stretch may be set at any amount up to 10 in. (25.4 cm.) by adjustment in the slotted crank arm at *B*. The initial position of the slide *C* may be adjusted by means of set screw *J*.

The stress-strain relation is recorded on stylograph paper by a slight pressure of a steel point at *H*. The recorded curves, although adequate for many purposes, are not drawn to truly rectangular coordinates. In order to transfer results to rectangular coordinates a calibrated glass template, corresponding to the spring used, is employed in conjunction with the proper elongation scale. For precise work a correction may be made for the compression of the spring.

Ring samples cut from sheets with a die are used. Results may be obtained with these samples which are adequate for many purposes. These rings, however, have the obvious disadvantage that the outside and the inside are under different degrees of strain when the sample is stretched.

In some work not reported two other types of samples were used: straight strips held in grips and thin rings cut from a tube formed on a mandrel by deposition. The former are satisfactory for low elongations where the concentration of stresses at the grips is not important. The latter have advantages over rings cut from sheets in that the inside and outside diameters can be made more nearly equal. The type of grip described by Hahn and Dietrich[3] could probably also be adapted to this machine.

The initial-stretch curve, which is ordinarily used in evaluating a rubber compound, is possibly the most definite, but it is interesting to note that it is the curve least permanent in character. It apparently cannot be retraced after the rubber has once been stretched. If the stress-strain curve is to be used in designing rubber compounds for specific purposes, it is obvious that the conventional curve may not give the proper stress-strain relations.

A study of the phenomena encountered in the repeated stressing of rubber, taking into consideration different compounding ingredients, different degrees of vulcanization, etc., should throw light on the structure of rubber compounds and on the behavior of different compounding ingredients in them. This work indicates that the lower part of the stress-strain curve, which is seldom accurately determined, may have an important bearing on the real properties of a compound.

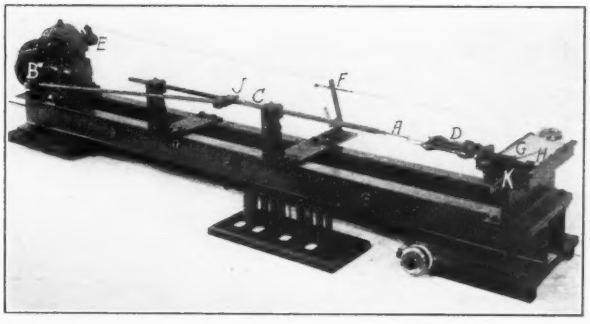


Fig. 2. Apparatus for Recording Stress-Strain Properties of Rubber

[1] Presented before the Division of Rubber Chemistry at the 82nd meeting of the Amer. Chem. Soc., Buffalo, N. Y., Aug. 31 to Sept. 4, 1931. *Ind. Eng. Chem.*, Dec., 1931.

[2] Bureau of Standards, Washington, D. C.

[3] *Ind. Eng. Chem.*, Anal. Ed., 3, 218 (1931); India Rubber World, July, 1931, pp. 71-72.

The apparatus described was constructed primarily for investigational studies, but the speed and the ease with which a stress-strain record of a rubber sample is made suggests the use of a machine of this type for certain classes of routine testing.

Conclusions

The stress-strain relations of a sample of rubber are very markedly affected by the previous-strain history.

Rubber will recover to some extent from the effects of a strain, but not completely.

In a rubber compound, such as tread stock, a series of increasing strains has a pronounced progressive action, each increase in strain producing added effects.

The conventional stress-strain curve does not represent the permanent characteristics of a rubber compound.

Duprene

In connection with the announcement by the E. I. du Pont de Nemours Co. of its production of the synthetic rubber known as Duprene it is also stated that the original essential reaction was discovered in 1905 by the Rev. Julius Arthur Nieuwland, then a young scientist on the faculty of the University of Notre Dame, South Bend, Ind. At that time he produced a gas by passing acetylene into a solution of copper and ammonium chloride. After 14 years of experiment he produced an oil later identified as dirinyl acetylene from which the new synthetic rubber is made by the controlled polymerization of chloroprene. Chloroprene is made by the catalytic polymerization of acetylene to mono-vinyl-acetylene which is then treated with hydrogen chloride to produce chloroprene. This chemical result has led to the selection of Duprene as the trade name for the new rubber.

It has required the concentrated efforts of more than a score of chemists over a period of several years to discover the proper conditions for bringing together the raw materials necessary namely: coal, limestone, salt, and water, to produce the new synthetic rubber.

Effect of Gas Black on Rubber[1]

It was attempted to find means of determining something regarding the nature of the forces causing reenforcement. Only raw rubber was used. It was shown that changes in the solubility of gas black and rubber mixings are not parallel with the changes in plasticity. Gas black and rubber mixings become insoluble only on being stored after milling, which makes it improbable that the insolubility of these mixings is due to flocculation of the gas black. It could not be established that rubber is adsorbed from its solution by gas black.

The wetting heat of the black with toluol was the same as that in a solution of 5 per cent rubber in toluol, as also was the amount of gas liberated by the wetting. The dispersion effect of the rubber solutions is, therefore, not due to superior wetting.

[1]P. Stamberger, *Kautschuk*, Oct., 1931, pp. 182-86.

Rubber Bibliography

ACETYLENE POLYMERS AND THEIR DERIVATIVES. I. The Controlled Polymerization of Acetylene. J. A. Nieuwland, W. S. Calcott, F. B. Downing, and A. S. Carter. *J. Am. Chem. Soc.*, Nov., 1931, pp. 4197-202. II. A New Synthetic Rubber Chloroprene and Its Polymers. W. H. Carothers, I. Williams, A. M. Collins, and J. E. Kirby, *Ibid.*, Nov., 1931, pp. 4203-25.

MYSTERIES OF MASTICATION. F. H. Cotton, *India Rubber J.*, (An. Ed.,) Nov. 2, 1931, pp. 590-93.

EBONITE DUST. How Used. How Made. A. Fraser, *India Rubber J.*, (An. Ed.,) Nov. 2, 1931 pp. 594-95.

TIRE CORD. H. P. Gurney and E. H. Davis, *India Rubber J.*, (An. Ed.,) Nov. 2, 1931, pp. 599-607.

THE FUTURE OF RUBBER. S. S. Pickles, *India Rubber J.*, (An. Ed.,) Nov. 2, 1931, pp. 610-12.

PRESERVATION OF RUBBER BY SURFACE TREATMENT. T. R. Dawson, *Trans. Inst. Rubber Ind.*, Aug., 1931, pp. 95-111.

ABSORPTION OF SHOCKS AND VIBRATION OF RUBBER. J. Morrison, *Trans. Inst. Rubber Ind.*, Aug., 1931, pp. 112-28.

COLORS USED IN THE RUBBER INDUSTRY. G. F. Thompson, *Trans. Inst. Rubber Ind.*, Aug., 1931, pp. 129-43.

INFLUENCE OF WHITE FACTICE ON THE VULCANIZATION OF ACCELERATED RUBBER STOCKS. H. C. Baker, W. H. Bodger, and F. H. Cotton, *Trans. Inst. Rubber Ind.*, Aug., 1931, pp. 144-57.

INFLUENCE OF RATE OF STRETCHING IN TENSILE TESTING. R. Dorey, *Trans. Inst. Rubber Ind.*, Aug., 1931, pp. 158-68.

THEORY AND APPLICATION OF THE PARALLEL-PLATE PLASTIMETER. J. R. Scott, *Trans. Inst. Rubber Ind., Aug.*, 1931, pp. 169-86.

USE OF SOME SYNTHETIC RESINS IN THE RUBBER INDUSTRY. W. J. S. Naunton and F. J. Siddle, *India Rubber J.*, Oct. 24, 1931, pp. 535-38; Oct. 31, pp. 561-63.

HARD RUBBER IN THE PULP AND PAPER INDUSTRY. C. S. Snider, *Pulp & Paper Mag. Can.*, 30, 1022-23 (1931).

ISOPRENE AND RUBBER. XXXIV. Molecules or Micelles in a Rubber Solution. H. Staudinger and H. F. Bondy with J. Joseph and E. O. Leupold, *Ann.*, 488, 127-53 (1931).

A REVIEW OF F. M. S. STATISTICS RELATING TO RUBBER PRODUCTION. J. Gordon-Carrie, *Malayan Agr. J.*, 1931, 19, 214-17.

SIXTH REPORT ON NATIVE RUBBER CULTIVATION Division of Agricultural Economics of the Department of Agriculture, Industry and Commerce at Buitenzorg, Java, from September, 1930, to March 18, 1931. (Bataviacentrum: Landsdrukkerij, 1931).

INVESTIGATION INTO THE RELATION BETWEEN THE DIAMETER OF THE LATEX TUBES AND THE RUBBER PRODUCTION OF HEVEA BRASILIENSIS. *Trop. Agr. Ceylon*, 1931, 76, 146-69.

STUDY IN ACCELERATED AGING OF RUBBER WITH THE AID OF THE MERCURY VAPOR LAMP. L. Graffe, *Caoutchouc & gutta-percha*, Oct. 15, 1931, pp. 15714-18.

ACCELERATORS. F. Jacobs, *Caoutchouc & gutta-percha*, Oct. 15, 1931, pp. 15718-26.

PATENTS ON ELECTROPHORESIS OF LATEX. R. Ditmar, *Caoutchouc & gutta-percha*, Oct. 15, 1931, pp. 15726 (Conclusion).

STABILIZATION OF LATEX. R. Ditmar, *Caoutchouc & gutta-percha*, Oct. 15, 1931, pp. 15732-33.

INVESTIGATING THE ACTION OF GAS BLACK ON RUBBER. P. Stamberger, *Kautschuk*, Oct., 1931, pp. 182-86.

VULCANIZATION TESTS WITH THE ACCELERATOR ACTIVATOR BARAK. E. A. Hauser and H. Wolf, *Kautschuk*, Oct., 1931, pp. 186-88.

ACTION OF SELENIUM IN RUBBER MIXINGS. W. Esch, *Kautschuk*, Oct., 1931, pp. 190-94.

MANUFACTURE OF MOLDED HOSE. R. Campredon, *Rev. gén. caoutchouc*, Sept., 1931, pp. 11-20.

PLASTIFICATION OF RUBBER. F. Jacobs, *Rev. gén. caoutchouc*, Sept., 1931, pp. 25-31. (To be continued).

FURTHER DUSTING EXPERIMENTS AGAINST OIDIUM. R. K. S. Murray, *Trop. Agr.*, Aug., 1931, pp. 112-19.

METHODS OF FIELD EXPERIMENTS IN RUBBER CULTIVATION. J. S. Vollema, *Arch. rubbercultuur*, Sept., 1931, pp. 391-420. English summary, pp. 421-22.

PHYLLOTAXIS IN HEVEA BRASILIENSIS. F. W. Ostendorp and H. Ramaer, *Arch. rubbercultuur*, Sept., 1931, pp. 423-36.

RESULTS OBTAINED WITH FIVE TAPPING SYSTEMS. J. van Baalen, *Arch. rubbercultuur*, Sept., 1931, pp. 441-79.

MANUFACTURE OF TECHNICAL MOLDED ARTICLES. *Gummi-Ztg.*, Oct. 23, 1931, pp. 114-16.

CONCERNING ACTIVE FILLERS. W. Bachmann, J. Behre, and P. Blankenstein, *Kolloid-Z.*, Oct., 1931, pp. 64-80.

EFFECT OF COVERS AND CLEARING METHODS ON THE GROWTH OF YOUNG RUBBER. A. R. Anderson and W. B. Haines, *J. Rubber Research Inst.*, Malaya, Aug., 1931, pp. 28-34.

STANDARD INSTRUCTIONS FOR PROTECTING PRUNED SURFACES IN BUDDING OPERATIONS. A. Sharples and C. E. T. Mann. *J. Rubber Research Inst.*, Malaya, Aug., 1931, pp. 35-40.

HEUSSER SYSTEM OF DOUBLE TAPPING AS APPLIED TO PRANG BESAR CLONES. R. J. Chittenden, *J. Rubber Research Inst.*, Malaya, Aug., 1931, pp. 41-47.

Titanium Dioxide as Reaction Regulator in Manufacturing Radifix[1]

In manufacturing Radifix, an erasing material made of factice without any rubber, a mixture of sulphur chloride and carbon tetrachloride is added to a mixture of colza oil, carbon tetrachloride, and Kieselguhr (infusorial earth). After 4 to 5 minutes a violent reaction sets in and, if not moderated in time, it causes the formation of a spongy mass. If, however, titanium dioxide is added to the colza-oil mixture, the reaction is quiet, and there is no danger of the formation of sponge.

[1]Rudolf Ditmar, *Caoutchouc & gutta-percha*, Sept. 15, 1931, p. 15684.

Scorch Retarders and Scorch-Retarding Materials[1]

H. R. Thies[2]

THE practical bearing of this subject is indicated in the following portions of the author's paper outlining the scope, methods, and conclusions of the study.

A class of materials known as scorch retarders has been available for some time and has been the subject of investigation in various laboratories for a considerably longer time. The ideal material of this type is one which can be added to a rubber compound and render it decidedly less scorchy at milling and calendering temperatures, yet not interfere with the curing rate of the compound at its curing temperature. Such a material should have no effect upon color, should not be detrimental to the aging properties of rubber compounds, and should be practically odorless when used in rubber; and its activity should be such that it is necessary to use only a small amount of the retarder.

Practical experience has taught that certain softeners are of benefit when scorching trouble is encountered in the factory, but the usual conception is that such ingredients soften the compound; the fact that these materials possess a definite scorch-retarding effect has not been so widely taught. The use of a scorch retarder seems to be a comparatively new practice, but the industry has been using compounds which function as such for years.

The effect that these materials have seems to indicate that the temperature coefficient at some temperature under that of the practical cure is altered by the scorch-retarding compound. If the same degree of cure is to be maintained in the same time in the presence of a scorch-retarding material as in its absence, and if at lower temperatures the material does hold off premature vulcanization, this change in temperature coefficient should be observable. In order to ascertain whether or not this condition is true and in order to demonstrate the behavior of these retarding materials at various temperatures, the work reported herein was undertaken.

Method of Determining Scorch

The solubility method of determining scorch was employed upon a compound of simple constituents. The compound consisted of the following ingredients:

	Parts
Rubber	100
Zinc oxide	10
Hansa yellow	10
Sulphur	3
Mercaptobenzothiazole	1
	124

It was used in the master-batch method. Scorch-retarding materials were added to this compound in the amounts of 0.25, 0.50, 0.75, and 1.0 parts per 100 parts of rubber; while softeners or activators, 1.0, 2.0, 3.0, and 4.0 parts were used.

In selecting a definite degree of scorch for all comparisons, solubility and swelling tests were made as shown in Figure 1. Here are shown the turbid suspensions of rubber compound in gasoline, and, in corresponding order, the same treated-rubber pellets which have been soaked in gasoline for 2 hrs. It is evident that the rubber sample which has been heated for a length of time sufficient to give a 105-mm. height of obscuring column (when immersed in gasoline 15 min. and shaken 1 min.) just begins to swell after 2 hrs.; this condition indicates set up, whereas the smooth dissolving as in the case of pellets heated for a shorter time does not. The time necessary to reach this definite degree of scorch is taken as the so-called index number and represents a sharp duplicable end point. Particular stress is laid upon the fact that all comparisons in this work are made using this degree of scorch.

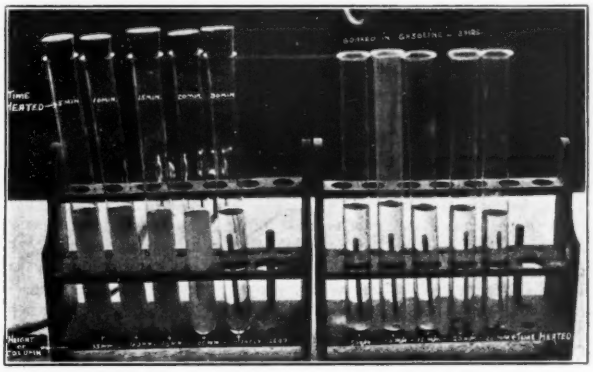


Fig. 1. Solubility and Swelling Tests on Rubber

In selecting a temperature range for study of scorching, 4 temperatures were chosen and obtained by boiling the following liquids in the special container:

	° C.	° F.
Ethylene dichloride	82	180
Water	99.5	210
Butyl alcohol	113.5	236
Cellosolve	130	266

The first of these temperatures might be considered as close to good milling temperature; the second could be considered as fair milling temperature; while the third would be called a high milling temperature. The fourth temperature tried is slightly above the temperature of cure.

Materials Used

Pine tar, mineral oil, and rosin oil were used as softeners. The mineral oil was a heavy viscous oil (specific gravity 1.06), known under the trade name of Para Flux. The rosin oil was a synthetic oil containing 50 per cent rosin and 50 per cent light petroleum oil. Stearic acid was tried as an activator and softener combined.

The retarding materials tried were: benzoic acid, *o*-chlorobenzoic acid, glyceryl phthalate, furoic acid (pyromucic acid), rosin, and zinc resinate.

Lack of space compels omission of the tabulated and charted results submitted by the author. Following is his summary in conclusion:

Conclusions

Softeners, such as pine tar, rosin oil, and mineral oil, are useful when scorching trouble is encountered, owing to their scorch-retarding properties as well as to the fact that they soften the rubber batch.

Stearic acid functions as a scorch-retarding material as well as an activating material when used with Captax.

A decided gain in scorching time is demonstrated by use of scorch-retarding material without alteration to a great extent of the physical properties of the compound used.

There is a definite change in the temperature coefficient of scorching encountered between 82° and 130° C., this coefficient being greater when rated per 10° C. for the temperature change between 82° and 99.5° C. than it is either between 99.5° and 113.5° C., or between 113.5° and 130° C.

The tendency on the part of the stocks containing some retarders is to give a greater percentage decrease in temperature coefficient of scorching over the range studied than does the control stock. With other retarding materials this condition does not hold.

A scorch-retarding material is best measured by its effect upon index numbers of a control stock rather than by its effect upon the temperature coefficient of scorching.

[1] Presented before the Division of Rubber Chemistry at the 82nd meeting of the Amer. Chem. Soc., Buffalo, N. Y., Aug. 31 to Sept. 4, 1931. *Ind. Eng. Chem.*, Dec., 1931.

[2] Goodyear Tire & Rubber Co., Akron, O.

Nerve of Rubber[1]

In his present article the author proves that the nerve of rubber can be determined by the capillary method devised and reported upon by Greinert and Behre in 1926. He also shows that there are linear relations between nerve and resistance to tearing of a rubber-sulphur mixing; thus rubber chemists now have simple and rapid means at hand for determining the quality of rubber.

[1] J. Behre, *Kautschuk*, Sept., 1931, pp. 161-165.

Technical Communications

The publishers of INDIA RUBBER WORLD are not responsible for statements and opinions appearing in this department

Correlation of Natural and Artificial Aging

BOMB and oven aging tests cannot be correlated because they produce different effects. Bomb aging might be correlated for certain types of stocks, with shelf aging provided the latter be standardized; but it is hardly conceivable that one correlation factor would apply to all rubber compounds irrespective of cure, composition, and thickness.

Bomb aging cannot be correlated in a general way with service aging because in service rubber is exposed to influences which are not duplicated by the bomb. Only when service conditions are closely similar to those of static, shelf, or storage aging, would it be possible to correlate and then only approximately.

Similarly oven aging cannot be correlated generally with service aging because it emphasizes only one factor which may or may not play a part in service: namely, heat.

The great value of accelerated aging tests is in the rapidity with which they permit aging comparisons of new stocks to be made with stocks that are of proven quality.

However important, they do not preclude other tests on rubber goods, such as resistance to light, heat, ozone, etc., and particularly those dynamic tests which seek to duplicate mechanical effects such as fatigue, flexing, cracking, abrasion, compression-shearing, and tear. No single test is known that can cover all these various effects, but it can be truly said that a compound which ages well in the bomb is certain to give far better service than one which ages badly.

The bomb and other accelerated aging tests are therefore an indispensable instrument of progress to the rubber industry. Data from *The Vanderbilt News*, R. T. Vanderbilt Co., Inc., 230 Park Ave., New York, N. Y.

Carbon Tetrachloride

CARBON tetrachloride is a chlorinated hydrocarbon with a pleasant aromatic odor, which boils at 76.7°C. (170°F.). It is a colorless, non-flammable, heavy liquid (D. 1.5947 at 20°/4°C.; one gallon weighs 13.3 lbs.), an excellent solvent for oils, fats, greases, and many other organic materials. Industrially, carbon tetrachloride is used in extraction work, fire extinguishers, dry cleaning fluids for large scale and home use, and other preparations. It mixes well with many other organic solvents and mixes only very slightly with water or with glycerine.

Carbon tetrachloride, dry and saturated with water, is stable. It hydrolyzes slowly in the presence of an excess of water, the decomposition being accelerated with rising temperatures. The health hazard in use is considered small, provided proper equipment and ventilation are employed.

The liquid and the vapor are non-flammable and non-explosive even when mixed with air. The heavy vapors do not support combustion: in fact, they have a smothering effect which is of advantage for extinguishing fires. When mixed with flammable solvents, the flash point of the mixture is raised; if there is sufficient carbon tetrachloride and the boiling point of the flammable constituent does not differ too widely from the boiling point of carbon tetrachloride, the mixture can be evaporated with safety.

Carbon tetrachloride has a milder physiological effect than gasoline and most other chlorinated hydrocarbons according to available data on its toxicity. Its odor is pleasant, non-irritating, and does not promote coughing. Prolonged exposure to high concentrations of its vapors may bring about serious physical disturbances, marked by drowsiness and nausea, and possibly irritation about the eyes, nose, and throat, etc. Intoxicating effects resulting from less serious exposure are rapidly overcome by fresh air. Data from The Roessler & Hasslacher Chemical Co., Inc., 350 Fifth Ave., Empire State Building, New York, N. Y.

Cleaning Rubberized Fabrics

THERE seems to be no thoroughly satisfactory method for cleaning mackintoshes, ground sheets, and other rubber surfaced fabrics. Dry cleaning methods using rubber solvents of any sort should be avoided. One available method is to wash the rubber with good soap and warm water, rinse well, and dry it quickly with a cloth; then dust it with Fuller's earth or French chalk, brushing off the excess dust. It has been suggested that if the soap and water wash is followed by another of dilute acetic acid or by one of dilute water solution of ammonium chloride and alkali, the cleaning effect will be completed.

Grease and oil stains may be removed with fair success, although the process is somewhat slow, by wiping the stain free from dust and covering it with a layer of ordinary rubber cement. The dry film of rubber pulls away easily, taking most of the oil with it. A repetition of the procedure if necessary, improves the result. It is to be noted that washed rubberized fabric should never be wrung out or squeezed dry, nor should it be dried before a fire or in sunlight. Data from *Rubber Age (London)*, Nov., 1931, p. 311.

Specific Gravity of Pigments

THE following method for determining the specific gravity of pigments used in the rubber industry is capable, with limitations, of applications to paint pigments. A standard rubber mixing is prepared from pale crepe rubber 100; lead free zinc oxide 7; mineral rubber 6; double pressed stearic acid 3; Captax accelerator 1; and "velvet" sulphur 3. This mixing has specific gravity of unity before or after vulcanizing.

A suitable proportion of the pigment to be tested is incorporated, for example, 1 part of carbon black to 3 of the mixing, and the whole vulcanized. The specific gravity of the product can be determined simply and that of the pigment arrived at by calculation. W. Esch in *Farben-Chem.*, 2, 154-56 (1931).

Selenium

SELENIUM is employed to advantage in rubber belts, inner tubes, insulated wire, oil resisting compounds, and rubber goods where rigidity, abrasion resistance, and long aging are essential. By its use in the friction for rubber belts, the adhesive strength is greatly increased and maintained under higher temperature conditions, affording a remarkable increase in the flexing life. Selenium has proved to be of great value in lengthening the life of automobile fan belts. Rubber compounds vulcanized with selenium are less affected by heat than those containing sulphur alone. Such compounds, therefore, are valuable in inner tubes for heavy duty where the life of the compound depends upon its ability to resist high temperature.

Selenium when used with sulphur and suitable organic accelerators to vulcanize hard service rubber jackets for insulated wire and cable toughens the compound and gives greater resistance to abrasion and oil absorption, at the same time greatly extending the natural life.

Compounds of remarkably long life are made by the use of either selenium or tellurium in the presence of tuads as vulcanizing agents. Accelerated aging tests on such compounds predict that there will be very little change in the physical properties after 60-80 years of aging in the absence of light. The phenomenally long life of these compounds is due to the fact that the amount of vulcanizing agent which reacts can be so controlled that it is impossible to overcure the compound, and consequently the correct amount of vulcanizing agent combines with the rubber to give a stable, soft vulcanized rubber compound. Charles R. Boggs, in "Modern Progress in Rubber Compounding."

New Machines and Appliances

Hi-Speed Ring Cutter

A HIGHLY important phase in the production of jar rings involved the development of a high speed automatic machine for accurate cutting. Much time and effort have been devoted in the past to the solution of this problem but with indifferent results as compared with the performance of the machine pictured in the accompanying illustration. This machine practically renders obsolescent for accuracy and speed many of the earlier machines intended for ring cutting on a production basis. While designed principally for cutting jar rings, this automatic machine is adapted for any other ring and washer cutting where large production is required.

The mechanism, mounted on cast iron supports at convenient working height, is operated by two motors: one for driving the work and general mechanism, and the other for driving the knife. All high speed gears run in oil, and the shafts are mounted on ball bearings wherever advisable. The carriage feed is continuous. The width of the ring cut is determined by oscillating the work mandrel, its movement being timed to correspond with the lateral travel of the knife during the cutting period. The tail stock is adjustably mounted so that mandrels up to 40 in. long may be used. It will be noted that the carriage mechanism is inverted. In other words it is suspended above the work and thus is kept free from dust and water incidental to cutting the rubber rings.

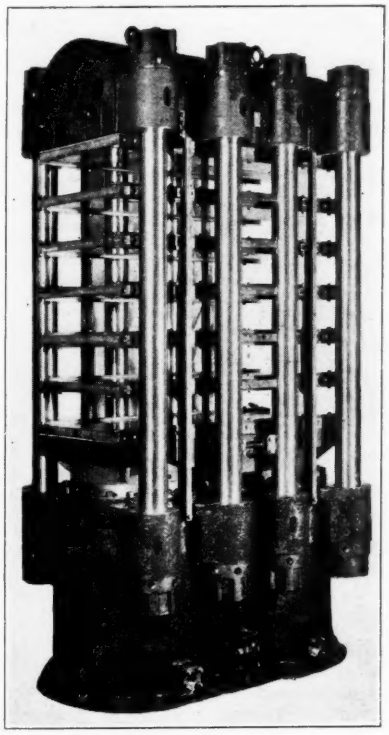
Among the valuable time saving features embodied in the machine are these. The carriage and the work automatically stop at the end of the cut, throwing back the knife so that the entire carriage is automatically returned to the starting position. The machine is under push button control, and all its moving parts successfully function at higher speed than rubber can be cut. In other words the cutting speed is limited only by the time required to make the cuts. The machine is very smooth running and is capable of cutting lipped rings at not less than 200 per minute with a single knife. The Black Rock Mfg. Co., Bridgeport, Conn.

Tandem Hydraulic Press

A TANDEM design vulcanizing press convertible at small expense into two standard presses when desired is something radically new in rubber pressroom equipment. The overall height of the 6-deck machine is 13 feet.

A number of important special features are incorporated in the design of this press vulcanizer, derived from engineering contacts with actual factory working conditions all of which contribute materially to the efficiency of the press in service. The press shown in the illustration was built for molding rubber automotive parts upon which 3 times the ordinary platen pressure can be applied.

Important among the structural details of this press are the following. The platens are drilled to afford exceptionally uniform heating. The platen plugs are of bronze. All of the steel castings are thoroughly annealed, but the cast iron ram is chilled very hard. The high tension steel strain rods are ground to absolutely uniform diameter, and the strain rod lugs have extra wide shoulder bearings. The maximum deflection of the press is .003 inches. The Adamson Machine Co., Akron, O.

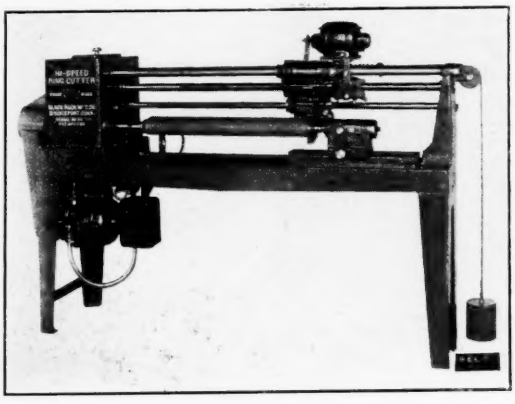


Adamson Press Vulcanizer

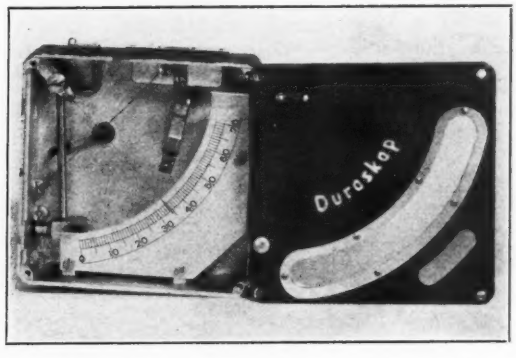
Portable Hardness Tester

THE portable instrument, here pictured, known as the Duroskop is primarily a hardness tester for metals. It depends on the dynamic principle of a falling pendulum rather than on static tests of the usual hardness instrument. It also measures resilience and can be applied to such materials as rubber, vulcanized fiber, plastic products, linoleum, etc., as well as to metals.

The readings are made very simply and require only a few seconds. The piece of rubber to be tested if small or thin is held or clamped firmly against a solid backing. In making a test the opening in the side of the case is placed over the spot to be tested. The pendulum released by pressure of a pin on the back of the instrument falls and strikes against the test piece through the opening and rebounds, carrying a light pointer with it, to the highest point on the scale to which it rises. This pointer is under a slight pressure from a wire stretched across it, which holds it lightly against the edge of the scale so that the pointer registers the highest point of the rebound.



Hi-Speed Ring Cutter



Duroskop Hardness Tester Depends on the Dynamic Principle of a Falling Pendulum

After the reading the pendulum is returned to its upper position by turning a spring-actuated lever on the back of the instrument. A leaf spring engages and holds the pendulum ready for the next test. In being raised to this position the pendulum carries along the pointer to the upper end of the scale where an inclined portion of the dial serves to lift the pointer out of engagement with the pendulum hammer and lets it slip back over the dial a short distance. From this position the pointer is returned to zero by moving a lever on the face of the case, and the instrument is ready for the next test.

The Duroskop tester has been in use in Germany and other European countries for several years. Although not much is known about its use outside of the metal industries, it is being applied in other fields including rubber. The R. Y. Ferner Co., Investment Bldg., Washington, D. C.

High Speed Gear Units

IN CURRENT engineering practice standard industrial gear units are designed for use with electric motors running at a maximum speed of 1,800 r.p.m., and they are suitable for reducing speed but not for increasing speed, and for tooth velocities not exceeding 2,000 r.p.m.

When a gear unit is required for connection to a steam turbine or for any other purpose where the speed of the pinion shaft is over 1,800 r.p.m., the unit is considered special. Now, however, a series of gear units has been developed and standardized suitable for speeds up to 6,000 r.p.m. and powers from 120 h.p. to 2,500 h.p., with ratios up to 10 to 1 for either increasing or reducing speed.

The picture illustrates one of these units with the cover removed to show the gears, which are herringbone continuous tooth type. A complete lubrication system is provided, together with an oil cooler consisting of a coil of copper pipe placed in the bottom of the gear case.

The gear unit is self-contained, having its own lubricating pump, oil tank, cooler where necessary, lubricating fittings consisting of a pressure gage and a relief valve. The oil pressure should be between 10 and 15 pounds per square inch. There is no advantage in high oil pressures, and the pressure gage is merely to indicate that there is enough pressure to provide a sufficient volume of oil. The relief valve on the unit is set to give the correct volume of oil before it leaves the factory, and it should not be closed to get a higher pressure. Farrel-Birmingham Co., Inc., Ansonia, Conn.

Research Microscope

A MICROSCOPE in a chemical laboratory is a daily convenience. The model illustrated is extensively used for research. This instrument is most substantially built and provided with substage illuminating devices permitting various modes of illumination. The large stage 153 mm. in diameter is graduated on the periphery and has attached thereto a mechanical stage. The ease and the convenience with which the monocular or binocular body tubes are interchanged is appreciated by the microscopist. The high standard objectives supplied with this microscope assure resolution and definition to an extremely high degree.

Leitz Research Microscope

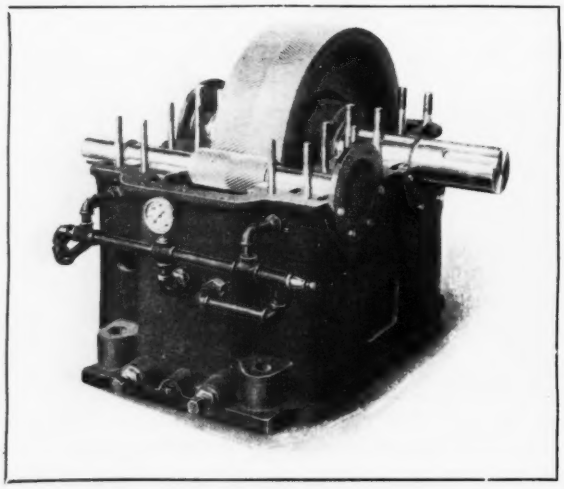
This microscope is utilized most extensively in research and industrial laboratories. Through its aid complete elimination of eyestrain is effected; while eye-fatigue is reduced to a minimum. In colloidal chemical research work this instrument serves through the aid of an ultra condenser for quantitative as well as qualitative investigations of solutions, etc.

Through the aid of a microspectroscopic attachment it serves for the observation of absorption spectrums of microscopic objects such as crystals and liquids. By means of polarizing attachments it aids greatly in the investigations of various specimens which ordinarily cannot be determined through routine investigations. This instrument can be used excellently for photomicrography and for projection purposes, the latter, by means of one of the intense arc lamps furnished by the makers of the microscope. E. Leitz, Inc., 60 E. 10th St., New York, N. Y.

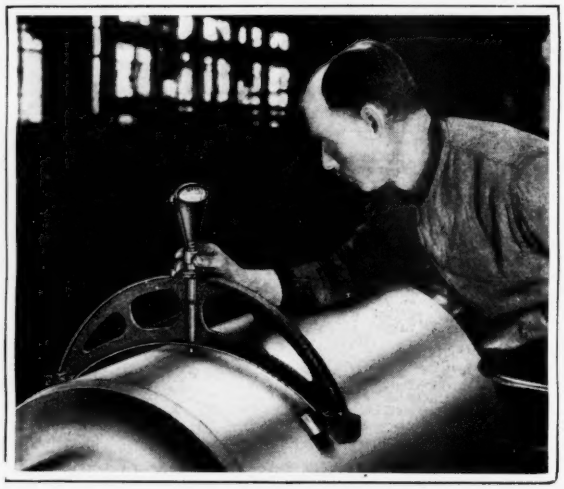
Mikrotast Indicator

ONE application is here pictured of what are known as the Krupp Mikrotast Indicators which depend for their amplification on a unique arrangement of three knife edges permitting an internal lever arm length of 0.008-inch. This relatively long leverage not only tends to reduce contact pressure but, more important, it insures great marginal scale accuracy. In other words, the Mikrotast will indicate readings at either extremity of the scale as accurately as at the center.

This gaging system comprises large saddle or straddle gages for measuring cylinders from ¼-inch to 39¾ inches diameter. Set to a plug gage, Krupp Mikrotast saddles will indicate in actual figures any deviation from the master ratio of 1 to 1 without exaggerating or minimizing an eccentric condition. Coats Machine Tool Co., Inc., 110-112 W. 40th St., N. Y. C.

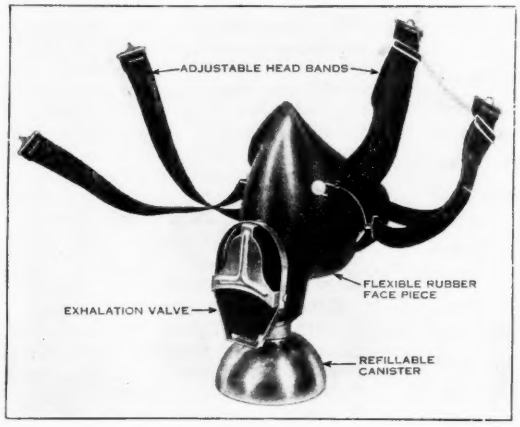


Farrel-Birmingham Gear Unit

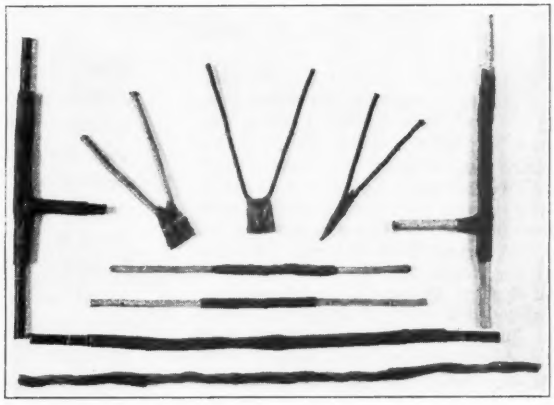


Krupp Mikrotast Saddle Gage

New Goods and Specialties



Face Piece Features



Two-in-One Combination Rubber and Friction Tape

M-S-A Half Masks

SERIOUS thinking on industrial safety is constantly bringing to the fore new types of such equipment in which rubber has an important role. Among safety appliances will be found the M-S-A half masks, the outstanding feature of which is a new style face piece developed by W. P. Biggs, Senior Safety Engineer, United States Navy. The face piece, as shown in the illustration, is made of soft, pliable black rubber, which goes over the nose and under the chin, readily conforming to the contour of the face.

The construction of the face piece permits full vision or the wearing of goggles. The adjustable headbands give a snug, comfortable fit. The exhalation valve, strategically placed and guarded, closes instantly upon inhalation. These masks are available in three different assemblies: paint respirator type, canister type, and air stream type. Mine Safety Appliances Co., Pittsburgh, Pa.

New Friction Tape

THE mechanical sales division of The B. F. Goodrich Co., Akron, O., recently announced the development of a new friction tape, especially designed for electricians but also applicable to all uses of the ordinary product.

The tape is similar to inner tube patching material and practically vulcanizes in place after applied, making a solid covering for wire. The tape is listed by insurance underwriters and is approved for electrical use as taking the place of both insulating material and ordinary cloth tape.

In developing the new product Goodrich engineers have designed this tape so that it can be rolled lengthwise around an electric wire rather than wrapped and overlapped. It is especially applicable to wiring where it is difficult to wrap the wire. This tape is rolled over the wire like one would roll a cigaret. The edges are overlapped only slightly, and the vulcanizing agents in the product react to form a tight bond.

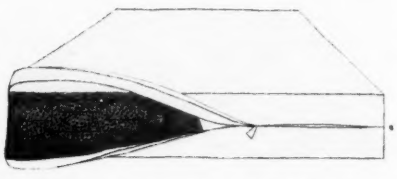
The tape is made in ¾- and 1½-inch widths and packed in rolls. The strips are backed with Holland, the same cloth material applied to tube patching rubber. This is removed as the tape is used.

Goodrich claims the tape will insulate 8,000 to 10,000 volts, that it has remarkable adhesion, is moisture proof, will not dry out and uncoil, has uniform thickness, and great strength, resists heat, cold and abrasion, fabric cannot unravel, preferred on small wires, is clean to handle, saves labor and material, and is economical.

The tape was tested and proved in the Goodrich laboratories and also saw actual service before it was announced to the market.

Sponge Rubber Mattress

FOR a night's better sleep now is offered a new type of mattress which is said to be a radical departure from all previous methods of mattress making. Restonair, as this innovation is known, in its material and construction represents an entirely new principle to insure comfort in sleep and rest. For this mattress is fashioned of rows of cellular sponge rubber blocks with horizontal and longitudinal air channels in between, affording a constant automatic circulation within the mattress. In its scientific construction of interconnected open air cells of porous rubber tissue it is designed to hold the weight of the sleeper's body in balanced suspension. This mattress is not pneumatic, nor is it inflated.



Inner Construction of Restonair

Many advantages are claimed for this type of mattress, which has already found wide use in hospitals, hotels, clubs, and on ships. It supports the entire body on a resilient, yielding surface which conforms to every contour, constantly adjusting itself to the movements of the sleeper.

Restonair contains nothing in it, no hair, cotton wool, kapoc, or vegetable fiber, on which bacteria, germs, or insects can feed. The fresh air circulation within keeps the mattress cool and dry, thus eliminating the warmth and the dampness that encourage germs and insects. The ticking, furthermore, in which it is enclosed can be easily removed and laundered. As the inner structure of the mattress is protected and completely enclosed in waterproof rubberized cloth, no liquids can penetrate. After the ticking is removed, it may be freely washed with a disinfecting solution or disinfected with gas. Stains may be removed with the usual solutions of hydrogen peroxide, household ammonia, alcohol, etc.

Lastly this mattress with its straight side lines and smooth surface makes up a neat, trim bed. It is available in all standard sizes: crib, quarter, three-quarter, twin bed, hospital bed, and double bed. Special sizes are made to order. Restonair, Inc., 10 E. 43rd St., New York, N. Y.

Rubber in Fish Bait

SINCE frogs are a natural food for all game fish, Elmer E. Rawdon, 620 Phillips Ave., Akron, O., has designed a bait known as the Tempter to resemble in every way a frog. This lure is fashioned of a composition of cork, rubber fabric, and other materials. Size, shape, coloring, and action are said to be lifelike, for real frogs were used as models. The Tempter is weedless; so can be slammed among the lilypads where the "big ones" feed. Its flashing white belly makes it a splendid night lure. The Tempter comes in three sizes: fly-rod, medium bait, and large bait.

American Rubber Executives

The brief personal sketches to be published on this page will eventually form a valuable record of the part played by American rubber executives in the progress of the industry. Presidents, vice presidents, secretaries, treasurers, sales and advertising managers, and other "key-men" are invited to send us their biographical data.

Harry E. Blythe, asst. to pres. *b.* June 23, 1890, Canton, O.; Canton High Sch., 1909; Mt. Union Coll., 1913; erecting engr., Alliance Machine Co., Alliance, O., 1913; stock, receiving, and acting shipping clerk, Timken Roller Bearing Co., Canton, O.; again erecting engr., Alliance Machine Co., Alliance, O.; joined Goodyear Tire & Rubber Co., Akron, O., 1915, serving in tire sales dept., aiding in sales promotion work, and being appointed Denver, Col., branch mgr. and later gvt. sales mgr. for Rocky Mt. Div.; transferred to prod. dept. in Akron, 1917; appointed mgr. flying squadron, mgr. efficiency dept., Goodyear Industrial Univ., and of personnel dept., Akron, O.; gen. supt., Goodyear Los Angeles, Calif., factory, 1921; v. pres., Goodyear Calif., 1926; studied mfg. and distrib. in Europe, 1926; asst. to Pres. P. W. Litchfield, Goodyear, Akron, O., 1928. *Member*: Masonic order, Sigma Nu fraternity, University and Portage Country Clubs, Akron, Hollywood and El Caballero Country Clubs, Los Angeles. *Address*: business, Goodyear Tire & Rubber Co., 1144 Market St., Akron.

George Holmes Carnahan, pres. *b.* Mar. 16, 1879, Cadiz, O.; public schools and under instruction in inorganic chemistry, geology, and metallurgy; engineering with mining companies in Leadville, Col., and Mexico, 1896-1900; exploration and mine development in Ecuador, 1900-02; gen. supt. of mines for Cia. Metalurgica Mexicana and subs., 1903-09; mgr. mines, mills, and smelters for Tezuitlan Copper Co., Mexico, 1910-14; pres., Intercontinental Rubber Co. and subs. (1915 to date): Continental Rubber Co. of N. Y.; Continental Mexican Rubber Co., Continental Plantation Co., American Rubber Producers, Inc., Cia. Explotadora de Hule, S. A., Cia. Ganadera y Textil de Cedros, S. A., Rubber Surfacers, Inc.; producers of guayule rubber in Mexico and California and hevea rubber growers in Sumatra; apptd. during World War (1918) by U. S. Alien Property Custodian as v. pres. and dir. of the Bayer Co., Inc. and other German corpns.; pioneered in development of large-scale guayule rubber cultivation in Southwest. *Author:* papers on rubber production; inventor of improved processes of rubber extraction from guayule shrub and nitrates from Chilean ores; patentee of new devices used in paper manufacture. *Member:* Lotos Club, N. Y. Athletic Club, Explorers' Club, all of New York; Fellow, American Geographical Society, Sons of the American Revolution, Councillor, U. S. Chamber of Commerce, La Jolla Country Club, Calif. *Address:* business, 1775 Broadway, New York; residence, 35 E. 76th St., New York.

Lee R. Jackson, v. pres., dir. of sales *b.* Apr. 28, 1891, Akron, O.; grammar and high schs.; Buchtel Coll., now Akron Univ., 1912; early sales experience in retail stores; salesman, Firestone Tire & Rubber Co., Akron, O., 1912; mgr., Grand Rapids, Mich., Indianapolis, Ind., and Minneapolis, Minn., Firestone branches; Firestone dist. mgr. for Pacific Coast then Detroit, Mich.; Firestone mfrs.' sales mgr., then gen. sales mgr., Akron, 1926; Firestone v. pres. and dir. of sales, Akron, 1929. *Member:* Masonic bodies, including Shrine, Lone Star Fraternity, Akron University, Portage Country, and Detroit Golf and Athletic clubs. *Address*: business, Firestone Tire & Rubber Co., Akron; residence, 210 Twin Oaks Rd., Akron.

Charles J. Jahant, v. pres., dir. *b.* June 19, 1885, Akron, O.; grammar sch., B. S. Buchtel Coll., 1909; specialized in rubber engrg.; department supt., Firestone Tire & Rubber Co., Akron, 1913-15; since then v. pres. of General Tire & Rubber Co., Akron, later chosen dir. *Member*: Akron City, Akron University, and Portage Country clubs. *Address*: business, General Tire & Rubber Co., Akron; residence, 655 N. Portage Path, Akron.

Ralph C. Kanaar, div. mgr. *b.* Aug. 13, 1895, Muskegon, Mich.; grammar and high schs., Muskegon Commercial Coll., 1913; teller, National Lumberman's Bank, Muskegon, 1913-17; U. S. Navy, 1917-18; teller, Cleveland Trust Co., Cleveland, O., 1919; gen. mgr., Perry Auto Lock Co., Chicago, Ill., 1920-22; office and credit mgr., Firestone Tire & Rubber Co., Akron, O., 1922-24; special factory sales representative, Firestone, handling large national and bus accounts, 1925-26; factory div. sales mgr., Firestone, supervising truck and bus sales of 11 branches, 1927-28; mgr. retail operations, Fisk Tire Co. at Cleveland, O., 1929; div. mgr., Lee Tire & Rubber Co., Kansas City, Mo., 1930; div. mgr., Lee, Dallas, Tex., 1931. *Member:* Mason, Shriner. *Address:* business, 2213 Griffin Ave., Dallas; residence, 5740 Gaston Ave., Dallas.

W. G. Klauss, pres. *b.* Nov. 25, 1878, Pittsburgh, Pa.; grammar sch. and private instruction; sheet metal mfg., 4 yrs.; with Atwood & McCaffrey, Pittsburgh, Pa., time-keeper to gen. supt., 4 yrs.; with Best Mfg. Co., Pittsburgh, Pa., becoming gen. mgr., 12 yrs.; with Johns-Manville Co., mgr. for 13 S. W. states, gen. sales mgr., asst. to chrmn of board, 12 yrs.; pres., Federal Match Co., Chicago, Ill., 1926; pres., India Tire & Rubber Co., Akron, O., 1928. *Member:* All Masonic branches and many clubs and societies. *Address*: India Tire & Rubber Co., Akron.

Gilbert L. Matthias, gen. supt. *b.* Oct. 15, 1886, Galion, O.; Galion High Sch.; special apprenticeship, Morgan Engrg. Co., Alliance, O., 1906-09; National Tube Co., Lorain, O., 1909-12; joined B. F. Goodrich Co., Akron, O., 1912, being successively draftsman, machine designer, mgr. machine devlpmt. dept., production supt., and gen. supt. mechanical div. *Address:* business, B. F. Goodrich Co., Akron, O.; residence, 388 Athens Rd., Silver Lake Village, O.; R. D. 1 Cuyahoga Falls, O.

Edwin Joel Thomas, asst. factory mgr. *b.* Apr. 27, 1899, Akron, O.; grad. Central High Sch., Akron; development dept., Goodyear Tire & Rubber Co., 1916; sec. to Factory Mgr. P. W. Litchfield; personnel mgr.; asst. to President P. W. Litchfield; v. pres. and gen. supt. Los Angeles, Calif., Goodyear plant, May 25, 1928; asst. factory mgr., Akron Goodyear plant, Aug. 1930. *Address*: business, Goodyear Tire & Rubber Co., Akron.

John Webster Thomas, v. pres. *b.* Nov. 18, 1880, Tallmadge, Summit Co., O.; Buchtel Academy, Buchtel Coll., Ph. B., 1904; chief chemist, Firestone Tire & Rubber Co., Akron, O., Jan., 1908; gen. supt., Firestone, Nov., 1911; v. pres., Firestone, Dec., 1919; dir. Firestone company, dir. Firestone Park Trust & Savings Bank, pres. bd. of directors Akron University. *Member:* Lone Star Fraternity, Ohio Society of New York, University, Akron City, and Portage Country clubs, Akron. *Address:* residence, 117 Edgerton Rd., Akron.

Robert C. Tucker, v. pres., gen. sales mgr. *b.* Dec. 17, 1893, St. Louis, Mo.; grammar sch., high sch., dental sch. of St. Louis Univ.; salesman, Bastian Bros., jewelers, Rochester, N. Y.; salesman Firestone Tire & Rubber Co., Birmingham, Ala., branch, 1919; mgr., Firestone branch, Charlotte, N. C., 1923; branch mgr., Firestone, Birmingham, Ala., 1923-27; trade sales mgr., Firestone Co., Akron, O., 1927-28; gen. sales mgr., new Firestone Los Angeles factory, Los Angeles, Calif., 1929; v. pres., California Firestone Co., 1931. *Member:* Los Angeles Rotary, L. A. Advertising Club, L. A. Lodge of Elks, Shrine (L. A. Consistory), L. A. Country Club, L. A. Jonathan Club. *Address:* business, Firestone Works, 2525 Firestone Blvd., Los Angeles, Calif.; residence, 1632 Victoria, Los Angeles.

Rubber Industry in America

OHIO

Mold Shops throughout the Akron district are doing very well and will experience several months of very good business as a result of tire size changes to meet the automobile manufacturers' demands.

Spring Dating. The following leading tire manufacturers are entering the spring dating period for tire sales with no change in prices on any of the various lines manufactured: The Goodyear Tire & Rubber Co., Firestone Tire & Rubber Co., The B. F. Goodrich Co., and the General Tire & Rubber Co. The spring dating period extends from November 15 to May 15 and is the period within which dealers lay in stocks for spring business. The prices made at the beginning of that period are guaranteed to dealers against decline, meaning that if lower prices are later effected in the period, dealers are rebated on tires bought at previous prices. In the case of price increase no adjustment is necessary.

General Tire & Rubber Co., Akron, announced, through President William O'Neil, the purchase of The Yale Tire & Rubber Co., New Haven, Conn. Yale tires and tubes in the future will be manufactured under the direction of the General Tire production department. This acquisition indicates further concentration of the tire manufacturing activities of the country in Akron. The Yale company is already in production on its products, which will be immediately available to General Tire dealers in all parts of the country and abroad.

At the company's annual sales conference, attended by approximately 250 representatives, held in Akron last month, President O'Neil made the following comment on the business situation and outlook: "I believe that 1932 will be a wonderful year, but good times will not be definitely established in the tire business until next July although they may come as early as May. We know that we are close to the end of the depression, but the successful man will be the one who works as though we were not. I believe that we will be amazed at the volume of business that will suddenly develop. The independent merchant is certain to be the final merchant in the tire business, for no chain store proposition can successfully deal in anything that cannot be merchandised automatically. The first 6 months probably will not be good for everyone, but it will be for those who go out after business." He also declared that tire merchants had suffered less than many other kinds of retailers during the depression which he characterized as the "most severe panic in the past 40 years."

Pneumatic Lug Tractor Tire

An entirely new product recently has been put on the market by The Goodyear Tire & Rubber Co., Akron. It is a pneumatic lug tractor tire designed especially

Goodyear Pneumatic

for tractor speeds, tractor weights and stresses, tractor requirements of sure-footedness and drawbar pull under all conditions. Its carcass is especially designed and constructed for the low pressures recommended. An efficient tractive tread design of large rubber lugs is placed diagonally across the tractive surface of the tire.

These pneumatics are available in four sizes: 36 by 6, 38 by 7, 40 by 8, and 42 by 9. Wheels for changeovers of present tractors may be had through tractor dealers or rim and wheel distributers.

The Wooster Rubber Co., Wooster, manufacturer of the "Sunshine" toy balloons and novelties, reports increased business. C. C. Gault is president and general manager.

Toledo Rubber Products Corp., 1130 Nebraska Ave., Toledo, manufactures Ezy Rubber Rugs. The officers are: F. M. Williams, president; E. W. Coble, vice president; W. F. Miller, secretary; and E. M. Belknap, treasurer.

Dayton Rubber Mfg. Co., Dayton, has made Carl Jones sales promotion manager, succeeding Ted Hardy, who will assume a new post as district manager of the company. Mr. Jones has been associated with the Dayton company for a number of years and previously had spent several years in sales promotion work with various firms.

Nelt Barr, president of The Barr Rubber Products Co., Sandusky, manufacturer of dipped and molded goods, was recently elected City Commissioner of Sandusky for a four-year term.

Queen City Rubber Co., 211 Walnut St., Cincinnati, is now in the hands of a recently appointed receiver, V. Rowland Shepard, as the result of a suit that was filed by the Buffalo Weaving Co., Buffalo, N. Y.

White & Co., Akron Savings & Loan Bldg., Akron, dealer in crude and reclaimed rubber, raw materials and softeners, through C. M. White, Jr., announced that Dwight W. Filkins, former purchasing agent of the Ferbert-Schorndorfer Co., Cleveland, has been made manager of the Cleveland office, Broadway and E. 15th St. Mr. Filkin will continue to sell the company's products to the paint and the rubber industries in Northern Ohio, which it has been serving for the past 11 years.

Mansfield Tire & Rubber Co., Mansfield, has recently added C. S. Dickey to its personnel as manager of the special brand department of the company. Mr. Dickey was formerly vice president and general manager of the Corduroy Tire Co., Grand Rapids, Mich.

The E. T. Clark Rubber Co., Akron, manufactures rubber supplies, etc., for morticians. E. T. Clark is president and treasurer; while B. A. Dames acts as vice president and secretary.

The Perfect Mfg. Co., Daylight Bldg., Cincinnati, O., manufactures Savasole shoe sole compound and rubber cement. Officers are: president, R. R. Bollman; vice president and purchasing agent, H. B. Flarsheim; and secretary, J. J. Marx.

The American Industrial Rubber Co., 532-36 S. St. Clair St., Toledo, manufactures industrial mechanical goods, specializing in vulcanizing rubber to metal. Officers are: H. H. Wolfe, president; C. E. Lavender, vice president; W. B. Frey, secretary-treasurer; and F. W. Knopp, purchasing agent.

The Better Rubber Co., dealer in dipped and molded rubber goods, 910 S. Main St. and at 5 W. South St., Akron, recently took over Rubber Sundries, Inc., at the S. Main St. address. C. M. Grandy is general manager of The Better Rubber Co.

The Imperial Rubber Co., 1833 E. Market St., Akron, reports increased business. The Imperial manufactures wringer rolls and corn husking rolls for the canning industry. The business of recovering old rolls is especially good at this time. Charles Walsh, son of C. M. Walsh, president of the former Swinehart Tire & Rubber Co., is president and general manager.

A True Son of His Father

Consider the world-wide organization that is the Firestone company; then note that the eldest son of Harvey Samuel Firestone, Sr., has played no small part in making the company what it is.

Harvey, Jr., was born April 20, 1898, in Chicago, Ill. He attended Asheville School, Asheville, N. C., and Princeton University, from which he was graduated June, 1920, a Bachelor of Arts.

In 1920 he joined his father's company. He became a director two years later and also vice president and manager of Firestone Steel Products Co., one of the world's largest rim plants. By 1926, when he relinquished the managership, the company's output had quadrupled.

Mr. Firestone, Sr., in 1926 determined to grow his own rubber; so he sent his oldest son to the rubber-producing countries to study the industry and to decide the most suitable region for it. Mr. Firestone, Jr., selecting Liberia, secured a 99-year lease for 1,000,000 acres from the Republic. His work there has greatly aided the economic development of Liberia.

In 1929 he became vice president of The Firestone Tire & Rubber Co. He helped the company much in its tremendous expansion in many fields: daily production of 80,000 tires; increased output of rims and other steel products; the Firestone battery plant; the footwear factory; and numerous cotton mills.

Although particularly interested in the foreign plantations, Mr. Firestone, Jr., still is active in the parent company and its other subsidiaries. He was identified with organizing the Firestone One-Stop Service Stores. The Firestone foreign development schedule also receives his attention. The company's modern structures at Brentford, England, and Llavallol, Argentina, built under his immediate supervision, are among the world's most efficient plants.

That Harvey Firestone is a very busy young executive may be judged from the offices he so capably fills: president and a director of the United States-Liberia Radio Corp. and Firestone de la Argentina, S. A.; vice president, general manager, and a director, Firestone Plantations Co.; a vice president and a director of The Firestone Tire & Rubber Co., (O.), Firestone Tire & Rubber Co. (W. Va.), Firestone Steel Products Co., Firestone Battery Co.; and a director of Firestone Plantations Co., Ltd., (England), Firestone Tire & Rubber Export Co., Firestone Realty Co., Firestone Park Land Co., and The First Central Trust Co.

Mr. Firestone, Jr., may be reached at the parent plant, Akron, O., or at 50 Twin Oaks Rd., where he lives with his family.

Goodrich Activities

The B. F. Goodrich Co., Akron, on November 2 to 4 held its annual sales conference of subsidiary tire organizations in the Mayflower Hotel, Akron, which was attended by about 100 sales representatives throughout the country. H. E. Keller, sales manager of the subsidiary organizations, was in charge. He outlined Miller, Hood, Diamond, Brunswick, and Defiance tire programs. Other

Harvey S. Firestone, Jr.

speakers were E. H. Barder, general superintendent of the Goodrich tire division; F. H. Atkins, credit department; C. R. Mason, manager Goodrich adjustment department; E. P. Weckesser, tire and tube sales; A. L. Bowman, truck and bus tire sales; E. A. Schneider, accessories; William Sewall, Miller and Hood advertising; M. G. Huntington, Diamond and Defiance advertising; P. J. Kelly, manager Goodrich advertising department; and W. A. Johnson, Brunswick sales manager.

The International B. F. Goodrich Corp., Akron, export division of the Goodrich company, has announced the appointment of Robert Tefel as representative in the West Indies, excepting Cuba, for Goodrich and its subsidiaries. After 7 years with the Lucey Mfg. Co., New York, N. Y., he joined the Miller Rubber Co. export division and gained extensive contacts in the West Indies and Mexico.

J. R. Hoover, for two years manager of the general chemical laboratories of The B. F. Goodrich Co., has been appointed to the chemical sales division of the company, and is succeeded in his former position by L. M. Freeman.

The estate of Frank H. Mason, director of The B. F. Goodrich Co., who died recently, is listed at $984,379.99, according to a recent report of appraisers filed with Probate Judge Lewis D. Slusser. The will left a large number of bequests to relatives, to the city of Akron for improvement, and a large number to charitable organizations.

Phillip J. Kelly, Goodrich advertising manager, was reelected vice president of The Association of National Advertisers at a recent meeting in Washington, D. C.

A rubber belt dressing, "Goodrich Plastikon," is now on the market. It is a hard substance containing no oil or grease and is manufactured in convenient stick form for application on a moving belt. The compound contains no chemical harmful to belt or pulley. The dressing gives a tacky belt surface, improving pulley contact for a long time, Goodrich claims.

The Magnetic Gauge Co., formerly at 368 Water St., Akron, moved to 60 E. Bartges St.

LEGAL

Drawbacks

Tires. (T. D. 45,140-H.) Manufactured by the Cooper Corp., Cuyahoga Falls, at its factory at Findlay, both in O., with cotton fabric produced under drawback regulations with the use of imported long staple cotton.

Drawback may be allowed under these regulations on tires manufactured on or after June 24, 1931. *Treasury Decisions*, Vol. 60, No. 13, pp. 13-14.

Tires. (T. D. 45,188-L.) Manufactured by The Goodyear Tire & Rubber Co. of California, Los Angeles, Calif., with cotton fabric produced under drawback regulations with the use of imported long staple cotton.

Rate effective on or after June 19, 1931. *Treasury Decisions*, Vol. 60, No. 17, p. 19.

Tires. (T. D. 45,218-V.) Manufactured by The Firestone Tire & Rubber Co., Akron, O., with cotton fabric produced under drawback regulations with the use of imported long staple cotton.

Rate effective as to tires manufactured and exported on or after September 1, 1931. *Treasury Decisions*, Vol. 60, No. 19, pp. 35-36.

OBITUARY

Fisk Representative

FOLLOWING a short illness from a hemorrhage of the stomach, William J. Lambe died in Harper Hospital, Detroit, Mich., on November 11. For 30 years he had been the Detroit representative of The Fisk Rubber Co.

The deceased was born about 50 years ago in St. Louis, Mo. He belonged to the Question, the Detroit Athletic, and the Bloomfield Hills Country clubs. Surviving are his widow, a sister, and a brother.

Inventor of Velvril

PROFESSOR WALTER FRANCIS REID, reputed inventor of a smokeless gunpowder, one of the founders of the British Aeronautical Society, and a scientist who had rendered outstanding services in the cement, linoleum, and rubber industries, died in a hospital at Kingston in Surrey, England, on November 18, at the age of 81, after being found unconscious in a decaying mansion near the village of Addlestone, where he had lived for years as a recluse.

In 1900 Professor Reid invented the rubber substitute Velvril and formed The Velvril Co., Ltd., London, England, of which he was managing director. For many years he was closely interested in the rubber industry, and in 1910 was elected president of the Society of Chemical Industry.

Professor Reid was one of the British delegates to the post-war conference in Paris that founded the International Union for Pure and Applied Chemistry. He made a fortune out of a process of silvering mirrors.

EASTERN AND SOUTHERN

H. Hentz & Co. Diamond Jubilee

On November 15, 1856, from Philadelphia came Henry Hentz to rent a small office at 5 Hanover St., New York, N. Y., for the commission house of H. Hentz & Co., which he founded with a capitalization of $700. Within a few years it became one of the most important cotton houses in Wall St. Mr. Hentz was a charter member and one of the organizers of the Cotton Exchange as well as a founder of the New York Coffee Exchange, now the New York Coffee & Sugar Exchange.

During the week of November 15, 1931, seventy-five years later, an informal observance of its anniversary was held by the Hentz company, which has gone also into the securities field, and now holds memberships in the leading commodity exchanges here and abroad. Its main offices are in the Cotton Exchange Bldg., Hanover Sq., New York, and it has branches in Boston, Mass., Detroit, Mich., Berlin, Germany, and Paris, France. The partners who control this ever-growing business are: Dr. Herman B. Baruch, Jerome Lewine, Hartwig N. Baruch, Edmund W. Fitzgerald, Rudolph Zenker, Sherman M. Bijur, Arthur J. Neumark, Sylvan E. Weil, and Lewis D. Raabin.

Westmoreland Products Co., Mahoning & Hobart Sts., New Castle, Pa., manufacturer of pure red iron oxide, Prussian blue, and FerSul, through Arthur M. Brown, secretary-treasurer, reports good business and an increasing demand for its "Fer-Ox" brand of iron oxide. Stewart P. Foltz is president of the company, and John S. Crowl, vice president.

Rubber Trade Association of New York, Inc., 33 S. William St., New York, N. Y., at its annual meeting November 12 unanimously elected R. Badenhop, and reelected W. E. Bruyn, D. D. Haldane, and J. L. Handy members of the board of directors to serve three years. C. T. Wilson was elected to serve one year. At a meeting of the Board immediately after the annual meeting, the following officers were elected to serve until November, 1932, or until their successors are chosen and assume office: president, D. D. Haldane; vice president, D. A. Paterson; treasurer, R. Badenhop; and secretary-manager, B. G. Davy.

Vulcanized Rubber Co., Morrisville, Pa., announces that hard rubber production has shown a little improvement of late.

Foster D. Snell, Inc., 130 Clinton St., Brooklyn, N. Y., chemist and engineer, is equipped for analytical, research, and consulting service on plant operation and the development of new products. This concern explains the scope of its activities in a pamphlet entitled "A Technical Organization Cooperating with Industry."

Marshall H. Pior

Enterprising Executive

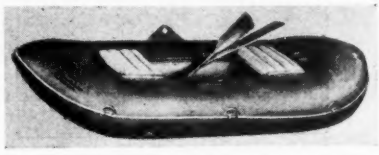
Marshall H. Pior, of Sweetwater, Tex., is a very ambitious young man. Not only is he branch manager of the Seiberling Rubber Co. at El Paso, Tex., but he is founder and owner of Pior Rubber Co. of Texas, with headquarters at Sweetwater and a branch at El Paso. The latter company includes all of West Texas, New Mexico, and Chihauhua, Mexico, in the retail and wholesale handling of Seiberling tires.

Mr. Pior was born in Woodland, Tex., in 1894. He attended Wellington High School. He is also former president of the Shook Rubber Co., Dallas.

His address is 716 Texas St., El Paso.

Chemicolloid Laboratories, Inc., 44 Whitehall St., New York, N. Y., distributer of the Charlotte colloid mill, through President George H. Rider, announced the appointment of the Schiller Engineering Co., 1605 Collingwood Ave., Detroit, Mich., as its agents for Michigan, northern Ohio, and northern Indiana. The Schiller company is owned and conducted by E. H. Schiller, formerly with and in charge of the J. H. Day Co.'s Cleveland office.

Professional Engineers' Committee on Unemployment, Engineering Societies' Bldg., 29 West 39th St., New York, N. Y., is a newly organized committee to help professional engineers to find employment and to give financial aid to those in actual need of relief. The committee consists of members of the four national engineering societies: the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers. H. de B. Parsons is chairman of the committee, and functions through an Executive Committee, of which John P. H. Perry is chairman, a Finance Committee, and a Relief Committee. A few hundred engineers are wanted now.



Air Boat with Inflated Seats and Floor

Airubber Improves Air Boats

INFLATED seats and floors in air boats have come to stay. These improvements were perfected at the New York Rubber Corp., Beacon, N. Y., which is also developing an accessory that by a simple turn of the handle inflates the boat in 10 seconds. It makes an emergency life raft available in short order; so if a plane is damaged in mid-ocean, passengers can row ashore.

In addition to the 2-man boat is a 6½ ft. one-man boat, a 9-ft. 4-man boat wide enough for 2 men to a seat, and a 7-man boat, 12 ft. long, here illustrated. The United States Navy has adopted these Airubber boats for Navy plane life rafts, and the Airubber people are now working on some sizable government contracts.

The inflated seats are made in the characteristic fashion of the familiar Airubber camp mattress. Inflation, however, does not make these seats soft and comfortable. They are inflated to provide rigidity, too hard for comfort. Incidentally should you inflate them soft for comfort they would sag; and a sagged boat seat is not so comfortable.

The new removable Airubber floor for the standard 2-man Pak-Boat is shaped fore and aft to accommodate itself to the shape of the boat. In the ordinary air boat the floor is just a piece of rubberized duck. But the use of the new supplementary floor provides a reasonably firm footing for oars and passengers, together with fishing tackle or hunting gear. This removable floor not only stiffens the boat but also the boatman's confidence under bad weather conditions. For while the two separate pontoons forming the sides of the boat will each support boat and passengers, if necessary, and in case of necessity the inflated seats alone will serve, here in this removable air-filled floor is a safety float which is abundantly able to provide support on the water even should all four of the boat's air chambers collapse. With this stiff floor in place, furthermore, the boat handles better.

The inflated seats of the 2-man Pak-Boat were originally pillow shaped. The change to the "board" style is the only alteration in the boat. The dimensions are still 8 ft. over all by 3 ft. 8 in. beam, and approximate weight of 25 pounds.

Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa., according to Vice President and General Manager J. S. Tritle, has appointed Ralph Leavenworth general advertising manager, having charge of all advertising and publicity activities of the company including the advertising division of the merchandising department, now centered in Mansfield, O. Prior to Mr. Leavenworth's association with the Westinghouse company, his business career has been one in which sales and advertising administrative work have been closely paralleled.

Keith Bon & Co., Inc., crude rubber dealer, through Secretary Richard H. Toeplitz has announced the removal of its offices from 44 Beaver St. to 99 Wall St., New York, N. Y.

New York Group

The next meeting of the New York Group, Rubber Division, A. C. S., will be held at 6:30 p.m., at the club rooms of the Building Trades Employers' Association, 2 Park Ave., New York, N. Y., December 16. Among the technical papers to be read is one on the application of latex to rubber manufacturing by J. B. Crockett, president of Heveatex Corp., Malden, Mass. A Christmas program, similar to the one that featured last year's meeting, has been prepared by the Entertainment Committee.

Heavier Golf Ball Adopted

The following statement by the Executive Committee of the United States Golf Association was announced November 20. "Effective for play January 1, 1932, the size of the golf ball shall not be less than 1.68 inches in diameter, and the weight shall not be greater than 1.62 ounces avoirdupois."

The new specifications give manufacturers greater freedom than they had with the "balloon" ball because the weight need not necessarily be 1.62 ounces. That is the maximum weight permitted just as 1.68 inches is the minimum diameter permitted. The British standard golf ball is 1.62-1.62; while the new American standard is the same in weight but .06 inch greater in diameter.

Foreign Trade Circulars

Special circulars containing foreign rubber trade information are now being published by the Rubber Division, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Number	Special Circulars
3089	British footwear exports, July, 1931.
3090	French tire exports, July, 1931.
3091	French footwear exports, July, 1931.
3092	Application of pneumatic tires to rails.
3096	German tire exports, July, 1931.
3097	Rubber Division special circulars, third quarter, 1931.
3099	Crude rubber reexports from United States, August, 1931.
3101	Canadian tire exports, August, 1931.
3104	First half of 1931 British exports of automobile tires and inner tubes.
3105	French tire exports, August, 1931.
3106	French footwear exports, August, 1931.
3108	Italian tire exports, first half of 1931.
3109	German tire exports, August, 1931.
3110	Belgian tire exports, July, 1931.
3111	British automobile casing exports, August, 1931.

J. Edward Myers, superintendent of the Acme Rubber Mfg. Co., Trenton, is at the head of a committee to secure new members for the Y. M. C. A., Trenton.

Pocono Rubber Cloth Co., Trenton, is experiencing a big revival in business and is now operating with both day and night shifts. The concern received several large orders for rubber cloth during the month, which will keep the plant busy for some time. Vice President and Treasurer Holland B. Slusser was elected president of the Trenton Kiwanis Club.

NEW JERSEY

Some New Jersey rubber companies report increased business while others announce a dropping off in orders. One big hard rubber concern, which had been running to capacity, was compelled to let employes go during the month when a sudden slump in business occurred. Concerns manufacturing rubber cloth have had to add to the number of employes and operate with night shifts. Hard rubber production remains normal at some plants; while athletic footwear has fallen off.

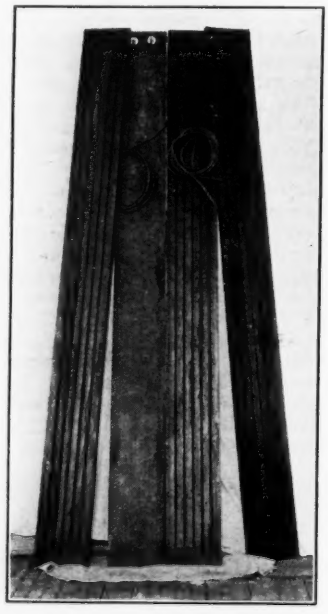
Traffic Signals for George Washington Memorial Bridge

The Manhattan Rubber Mfg. Division, Raybestos-Manhattan, Inc., Passaic, N. J., supplied conveyer belts to convey the materials for beginning the construction of the new George Washington Memorial Bridge spanning the Hudson River.

The accompanying illustration shows 4 of a lot of 31 rubber traffic signal pads the company made for this bridge. They measure 10 ft. long 11½ in. wide and are of molded rubber with complicated electrical contact elements encased in the rubber. These pads are set in the pavement in each lane at the approaches and record electrically the number of cars passing over the bridge in each lane and also check the toll receipts.

The perfecting of these pads was assisted by Manhattan engineers and Molded Goods Department for Mr. Cooper, of Taller & Cooper, New York, N. Y., contractor and patentee. A noteworthy feature of these pads is that they operate only with a rolling movement of a wheel and not when stepped or walked on.

This arrangement has vast possibilities as traffic signals at cross roads.



Rubber Traffic Markers

Golden Anniversary of Mr. and Mrs. W. J. B. Stokes

Mr. and Mrs. William J. B. Stokes, 219 W. State St., Trenton, on November 16 celebrated their fiftieth wedding anniversary with a family dinner. While Mr. and Mrs. Stokes have been active in the society life of Trenton, they have been more interested in charitable enterprises. Some years ago Mr. Stokes erected the Carolyn Stokes Day Nursery in East Trenton in memory of his daughter, who died a victim of the "flu." Mr. Stokes, son of the late Joseph Stokes, pioneer rubber manufacturer, is a prominent rubber manufacturer and has held important city positions. He is also president of the Joseph Stokes Rubber Co. His son, Robert J. Stokes, is president of the Thermoid Company.

The Joint Trade Show of the Motor and Equipment Association and the National Standard Parts Association will be held at Atlantic City from December 7 to 12. Among the manufacturers of rubber and allied products who will exhibit are: the Gates Rubber Co., Denver, Col.; Raybestos-Manhattan, Inc., Bridgeport, Conn.; Holfast Rubber Co., Atlanta, Ga.; L. H. Gilmer Co., Philadelphia, Pa.; Baldwin Rubber Co., Pontiac, Mich.; McKay Co., Pittsburgh, Pa.; Thermoid Company, Trenton, N. J.; Multibestos Co., Cambridge, Mass.; Dill Mfg. Co., Cleveland, O.; and E. I. du Pont de Nemours & Co.

Robert J. Stokes, Princeton, president of the Thermoid Company, Trenton, has perfected a type of armored hose which he has patented and assigned to the Thermoid Company. The concern reports normal operations.

Puritan Rubber Co., Trenton, finds business has improved during the past month.

Whitehead Bros. Rubber Co., Trenton, since business has not dropped off any during the past month, maintains the same number of employes.

Murray Rubber Co., Trenton, now manufactures 6,000 automobile tires a week. One of the officials declared that the output was much larger during the Summer and that business dropped off with the cooler weather. The plant is still operated under receivership.

Clifford H. Oakley, president of the Essex Rubber Co., Trenton, has returned to his home after an operation in a Philadelphia hospital and is now on the road to recovery.

Pierce-Roberts Rubber Co., Trenton, reports that business had dropped to a little below normal during the past month.

Joseph Stokes Rubber Co., Trenton, announces a slackening of business at both the Trenton and the Canadian plants.

Luzerne Rubber Co., Trenton, experienced some improvement in the output of hard rubber goods.

NEW ENGLAND

Davol Rubber Co., Providence, R. I. The 5-day working week with which many industrial concerns are now experimenting to combat unemployment, has been in successful operation for several years, through good periods and bad, at the Davol plants. The company does not contemplate lessening of its 5-day-week schedule. In fact a few departments just now are forced to operate on a Saturday overtime basis because of a great volume of business. According to company officials, no reduction in wage scales is being considered. The company employs 900 to 950 operatives, and its products consist of druggists' rubber supplies and hospital goods.

"Several years ago," said Secretary and Acting Treasurer Ernest L. Kilcup, "when the agitation for a 5-day week was started, the Davol Rubber Co. made a scientific survey of its possibilities. It was determined that the 5-day plan was both feasible and desirable. The plan was put into operation a number of years ago, without reduction of wages, and has worked out successfully and satisfactorily all round. Work has not been done on Saturdays unless, through force of orders, it has been necessary. There is no present contemplation of a reduction in wages or personnel."

Collyer Insulated Wire Co., Pawtucket, R. I., by direction of the management, disbursed a 12½ cents third dividend the past month, compared to a second quarter dividend of 25 cents a share. Concerning this dividend, Treasurer R. C. Moeller in the company's notice to its stockholders stated:

"Fortunately your officers laid aside some surplus in the past dozen years so that we are able to stand the shock of poor business and inventory losses and at the same time pay small dividends from this account. Our cash position is excellent, and we will be able to take advantage of favorable buying markets for raw materials as they occur. Our current quick assets are approximately $1,300,000 against all current liabilities of less than $100,000. The future outlook of this industry is considered excellent."

William P. Weinstein has filed a statement with the City Clerk office at Cranston, R. I., that he is sole owner of the Atlantic Tubing Co., Cranston. Notice has been filed with the Secretary of State of a change in name of the concern to the Atlantic Tubing & Rubber Co.

Charles A. Blake, who was formerly with the United States Rubber Co., on October 15 purchased a controlling interest in the Elm City Rubber Co., 214 E. St., New Haven, Conn., manufacturer of rubber specialties, and was elected its president and general manager. Robert M. Blake is vice president and secretary, and M. J. Servaty, treasurer. Mr. Blake, formerly located at 1123 Broadway, New York, N. Y., has moved his office to New Haven. Business is reported as being good, and additional factory help is being engaged.

Boston Group Meeting

Announcement is made by the Secretary of the Boston Group, Rubber Division, A. C. S., that it has been decided to defer the next meeting until the first of next year. Arrangements for the meeting are being completed.

Firestone Footwear Executive

The record, both public and private, of Charles Edward Speaks, a director, vice president, and general manager, Firestone Footwear Co., Boston, Mass., may well be

Chas. E. Speaks

envied by any man, for Lt. Colonel Speaks has served with distinction not only as a business executive but also as a soldier in the United States Army.

In 1912 he entered the Factory School of the Firestone Tire & Rubber Co., Akron, O., and the next year became manager of its Cycle Tire Department. Three years later he was made manager of the Truck Tire Department. Mr. Speaks, incidentally, organized the department and sold the first motor and bicycle tires manufactured by Firestone.

November, 1917, saw the name Charles Edward Speaks on the roll call of the United States Army, and he served in France until March, 1919. When he retired in June, 1919, it was with the rank of lieutenant colonel and as the justifiably proud possessor of two decorations, the United States Distinguished Service Medal and that of a French Officer of Academy Beaux Arts with Palms.

Mr. Speaks returned to Firestone in June 1919 as manager of the Government Department. In February, 1920, however, he was transferred to the Firestone London, England, office as European manager and remained there six years. He came back to the Firestone Akron factory in 1926 to manage the Truck and Bus Tire Department. The following year he was appointed to his present position.

He was born in Washington, D. C., on May 21, 1887, and was educated at the local grade and high schools, graduating from the latter in 1906. He belongs to the Tadmor Temple Shrine and the Army and Navy clubs, New York, N. Y., and Washinton, D. C. His home address is 221 Valentine St., W. Newton, and his business address 141 Brookline Ave., Boston, both in Mass.

R. C. Brown, sales manager of the elastic web division of the Russell Mfg. Co., maker of Rusco brake linings and more than 400 other fabric products, has moved his headquarters from the New York, N. Y., office of the company to the factory at Middletown, Conn.

The Woonsocket Rubber Co., Woonsocket, R. I., has been dissolved after a petition had been entered by the parent company, the United States Rubber Co. The Woonsocket company included the Alice Mill and the Millville rubber mill, both of which were idle, the former was closed down indefinitely last May, and the latter has been closed for more than a year.

Fisk Rubber Co.'s and the **A. G. Spalding & Bros.'** factories, both in Chicopee Falls, Mass., resumed operations last month after the plants had been closed down for a two-week period of inventory taking and plant readjustments. The Fisk company returned 1,600 workers resuming its 5-day schedule and is launching its sales campaign for the spring dating of tire orders. Some staggering of employment is being maintained at the plant to provide as much work as possible and to as many as possible. The Spalding plant resumed operations with 900 workers and will continue its 35-hour a week basis for each employe.

International Braid Co., Providence, R. I., has announced a new product, Lacelastic, an elastic shoe lacing, the core of which is of soft, flexible rubber, with a braided covering; so the lacing looks like ordinary shoe lacing. The rubber core permits stretching so that, when once laced with it, a shoe may be pulled on or taken off without disturbing the lacing. Little metal anchors hold the lacing at exactly the point needed to keep it where it belongs. Lacelastic is made in various colors and styles. The company, with principal offices at 47 Charles St., and 2 factories in Providence, and plants at Attleboro Falls, Mass., and Montreal, P. Q., Canada, has nominally 1,000 operatives. F. R. Parsons is president of the company; John R. Dennis, treasurer and general manager; and John W. Sherman, secretary.

The New Bedford Cotton Manufacturers Association announced a 10 per cent general wage cut, effective December 7, affecting 20,000 workers, including all executives, salaried employes, and wage earners. A number of mills, among which are Nashawena, Nonquitt, Page Beacon, Dartmouth, and tire fabric plants, have already made readjustments.

PACIFIC COAST

Representatives of the tire manufacturing companies of Los Angeles, Calif., at a recent conference of industrial leaders called by the Chamber of Commerce of that city gave assurance of the active cooperation of the rubber industry of the Southwest to relieve the unemployed. Favorable consideration was particularly given the 5-day-week plan as the one to afford the most immediate relief. In the general discussion it was brought out that in the recent past a much closer cooperation has developed between employer and employe, especially in the rubber industry, making for higher efficiency on the part of the worker. Much optimism was expressed regarding business conditions in the near future. It was reported that a number of manufacturers are now adding to their working forces on the assurance of much better business in January. Appearing for the tire concerns were: F. A. Nied and A. W. Phillips, Pacific Goodrich Rubber Co.; J. A. Moore, Firestone Tire & Rubber Co.; B. F. Schleicher, Samson Division, United States Rubber Co.; P. W. Beggs, Goodyear Tire & Rubber Co.; and F. S. Pratt, Pacific R. & H. Chemical Co., rubber reclaimer.

United States Rubber Co. has been very busy at its Samson Division plant in Los Angeles, Calif., the working schedule for November and December being 6 days a week and in 2 departments 7 days. The tire building department is being run in 2 9-hour shifts daily, and all others in 3 8-hour shifts. The sales situation is said to be better than for many months. Unit and dollar sales for the past 10 months have been somewhat better than for the same period last year. General Sales Manager J. B. Magee recently returned from a conference with executives at the company's main offices in Detroit, Mich. The workers in the local plant have been complimented for a substantial contribution to the city's Community Chest. They had been given an extra day's work, and they donated pay for 5 hours.

Pioneer Rubber Mills, San Francisco, Calif., finds general sentiment regarding the immediate business future much improved in the past few weeks. Demand for oil field and refinery rubber supplies and miscellaneous mechanical goods is noticeably better. The works at Pittsburg, Contra Costa Co., are running on almost full time, and the garden hose department is working overtime.

W. J. Voit Rubber Co., 2619 Nevin Ave., Los Angeles, Calif., has engaged Edward W. Snyder as chemist. Mr. Snyder last year as manager opened the first plant for making mechanical goods in Manila, P. I., and has had considerable experience in the production of a wide range of rubber goods. The Voit factory, which has been running of late largely on mechanicals and tire repair materials, expects soon to take on several other lines.

Goodyear Rubber Co., 539 Mission St., San Francisco, Calif., in operation since 1872, of which Howard Middleton is president, notes a gradual improvement in business and is busy with various rubber specialties, as well as staple mechanicals. J. B. Watson recently succeeded as treasurer David Wright, resigned. The Goodyear Rubber Co., 61-67 4th St., Portland, Ore., a selling organization affiliated with the San Francisco manufacturing concern, recently suffered the loss by death of its secretary, C. E. Mace. The vacancy is still unfilled.

Golf tournament. Many well-known Southwest rubber men took part in the second golf tournament of the Los Angeles Group of the Rubber Division, A. C. S., at Montebello Club, October 24. Bert Center, of the Goodyear Tire & Rubber Co., won the low gross. E. L. Davies and C. L. Ramey, both of the U. S. Rubber Co., won first and second prizes, respectively, in the blind bogey contests, the trophies being fountain pen desk sets donated by the Pacific Goodrich Rubber Co. At the dinner, at which E. L. Davies was toastmaster, representatives of the raw materials companies offered to underwrite a silver cup to be presented to the player winning a handicap low net score, the handicaps to be set by a committee to be named at the next meeting. The Rubber Group is planning to have four tournaments a year, the next probably in January, 1932.

American Rubber Mfg. Co., San Francisco, Calif., lost by death on November 11 its secretary, Paul B. Harris, who had long been ill at his home in Alameda. Mr. Harris, who was a native of Kentucky, was an old-time rubber man, had a wide circle of friends, and had been with the Dodge brothers, who operate the American company, practically since they started in business. He had long been one of the department heads in the American mills in Oakland.

Firestone Tire & Rubber Co., Los Angeles, Calif., has initiated a new production policy to benefit a larger number of workers than now employed. It has changed from an 8-hour day to a 6-hour one. According to Vice President and General Manager R. J. Cope the company has been operating nearly 2 years with an average of about 1,200 daily, but the change to the shorter time will permit hiring about 350 more men. Former employes in good standing will be given preference. No effort will be made to speed up production, but the output will be checked closely to ascertain if 4 shifts working 6 hours at a normal speed will result in greater production than 3 shifts on 8 hours, or vice versa.

The Firestone plant is very busy on spring dating orders and looks for a steady increase in that direction. Vice President and General Sales Manager R. E. Tucker, Service Stores Merchandising Manager W. D. Johnson, Los Angeles District Manager H. A. McKellar, and Resident Manager Geo. Crackel of Honolulu, H. I., attended the managers' conference at the office of the parent Firestone company in Akron, O., in the latter part of November. The new battery shop started production November 10 under the management of Homer G. Allen, who also has charge of the reclaiming plant. As in Akron, Firestone will have containers made outside and will make and assemble plates and other parts on the premises.

Dunlop Tire & Rubber Corp.'s tire sales on the Pacific Coast of late have been exceptionally large, according to a company report. Business for the past 3 months was much better than for the same period last year. Sales were much stimulated by a special drive, and dealers were troubled at times by a shortage due to a sudden demand on the Buffalo factory.

Pacific Goodrich Rubber Co., Los Angeles, Calif., has consolidated all its wholesale and retail activities in the Southwest in one building, 3430 South Hill St. The territory includes not only Southern California, but also Arizona, New Mexico, and Western Texas. The sales personnel comprises 75. R. F. Wood, formerly in charge of retail sales, has been made sales promotion manager for the new combination. Mr. Wood, twenty years with Goodrich, is well known in the Pacific Coast tire trade.

Production is gradually increasing at the Los Angeles Goodrich tire factory. Recent visitors from the parent works in Akron, O., included General Credit Manager E. A. Doerschuk, Specialized Sales Manager E. A. Schneider, and Subsidiary Sales Manager H. E. Keller. The following executives left November 21 to attend the general sales conference at the parent Goodrich works: Vice President and General Manager T. H. Farrington, General Sales Manager Frank E. Titus, E. W. Shaw, manager of Silvertown, Inc., Coast Sales Agency, and Advertising Manager R. E. Jeffers. Wm. Young, an experienced eastern salesman, has been added to the aeronautical sales force.

Goodyear Tire & Rubber Co., Los Angeles, Calif., reports a big start on spring tire dating business which will keep the factory working three shifts a day and with an increased force for at least 2 months more. A recent visitor at the factory was Clifton Slusser, vice president and factory manager of the main plant in Akron, O., and former general superintendent in Los Angeles. The company will conduct its tire-testing activities at Litchfield Park, near Phoenix, Ariz., to which a fleet of cars and trucks and a large force of men have been brought for experimental work.

FOUR MEN IN THE AIRBAG DIVISION WERE asked to move a tire rack. In going around a corner the rack got away from the men, resulting in injuries to the extent that one fractured the large toe of his right foot and the index finger on the right hand. The cause of this accident was inexperience on the part of these men, who certainly had not had much experience in moving equipment. *Rubber Section News Letter.* N. S. C.

MIDWEST

N. T. D. A. Convention

National Tire Dealers Association at its twelfth annual convention at Hotel Statler, Detroit, Mich., on November 16 to 18, elected the following officers for the ensuing year: president, Martin J. Barry, (reelected); first vice president, A. L. Gilck, (reelected); second vice president, J. B. Williams; secretary-manager, Norval P. Trimborn, (reelected); treasurer, M. G. Byrne; new directors, F. W. Smith, George J. Erlinger, R. F. Boda, Hess Thompson, U. S. Grant, and M. L. O'Brien. Holdover directors are Abe Goldstein, George E. DeWald, H. B. Harper, and Joseph H. Walsh. Approximately 200 dealers from all parts of the country attended the convention.

Included among the speakers were J. D. Tew, president of the B. F. Goodrich Co., Akron, O., who spoke on better merchandising needs of the industry; President Barry, who sees better times for tire dealers in 1932; and J. F. O'Shaughnessy, general manager of the United States Rubber Co., who advocated the eradication of bad practices and extravagances that beset the tire industry, stating that it is within the power of the tire dealer if he will but insist that the manufacturers take steps to remove them.

N. S. C. Congress

National Safety Council at its twentieth annual National Safety Congress recently held at Stevens Hotel, Chicago, Ill., elected the following officers for the ensuing year: general chairman, C. L. Hungerford, Firestone Tire & Rubber Co., Akron, O.; vice chairman in charge of program, J. R. Hanson, United States Rubber Co., Passaic, N. J.; secretary, H. W. Low, Miller Rubber Co., Akron; news-letter editor, Charles F. Smith, United States Rubber Reclaiming Co., Buffalo, N. Y.; poster committee chairman, R. A. Bullock, Corduroy Tire Co., Grand Rapids, Mich.; membership committee chairman, A. M. Dietz, Pennsylvania Rubber Co., Jeannette, Pa.; publicity committee chairman, M. A. Quirk, United States Rubber Co., Detroit, Mich.; statistics committee chairman, Roland Kastell, United States Rubber Co., Passaic; engineering committee chairman, M. H. Kilgore, Goodyear Tire & Rubber Co., Akron; health committee chairman, Dr. J. Newton Shirley, Hood Rubber Co., Watertown, Mass.; slides and safety kinks committee chairman, B. F. Gerpheide, Goodyear Tire & Rubber Co., Akron; members at large, E. W. Beck, United States Rubber Co., Passaic; J. T. Kidney, Goodyear Tire & Rubber Co., Akron; and W. L. Schneider, B. F. Goodrich Co., Akron. The Rubber Section had one of the most successful sessions ever conducted. The attendance was larger than ever, and considerable interest was displayed by old and new members.

H. H. Robertson, president of the H. H. Robertson Co., Pittsburgh, Pa., refiner of asphalts for use in rubber compounds, has been named a member of the Special Advisory Committee of the National Safety Council. Its purpose is to broaden the activities of the entire safety movement. Samuel Insull, Jr., of Chicago, heads the committee which includes presidents of several railroads and other large industrial groups.

Seiberling Branch Manager

On the roster of loyal F. A. Seiberling followers will be found the name of Ed. J. Rogers, manager of The Seiberling Rubber Co. branch, 2004 Baltimore Ave., Kansas City, Mo. Mr. Rogers began his business life, however, in 1913 as a mining machinery salesman for the Swan Machinery Co., Joplin, Mo. In 1915 he joined The Goodyear Tire & Rubber Co. as a general line salesman, became a mechanical goods salesman, and then Dallas, Tex., district manager of mechanical goods sales. But in 1922 because, to use his own words, "I wanted to stay with F. A., and he let me," Mr. Rogers joined the Seiberling company as a salesman. Three years later he was appointed to his present post.

Ed. J. Rogers

His birthday is June 5, 1891; his birthplace, Lyons, Kan. He was graduated from the Muskogee, Okla., High School and then for two years studied mechanical engineering at Oklahoma University.

Mr. Rogers is a 32nd degree Scottish Rite Mason and a Shriner. His hobby? As he himself expresses it, "I like to holler, 'Fore.'"

The Ajax Rubber Co., Inc., through L. T. Vance, receiver, announces that its completely equipped tire plant at Racine, Wis., will be sold at auction.

United States Rubber Co.'s Brake Lining Division, Detroit, Mich., organized last spring, has secured national representation and acceptance of its new latex-bonded brake lining, known as the "U. S. Royal Master." There are two other lines of U. S. brake lining—the U. S. Royal Heavy Service woven lining and the U. S. Royal Standard woven lining.

FINANCIAL

Raybestos-Manhattan, Inc.

Raybestos-Manhattan, Inc., earned $85,956.17, or 13 cents a share during the quarter ended September 30, 1931, as compared with $338,975.64, or 50 cents per share during the quarter preceding, and $126,477.23, or 19 cents per share, during the quarter ended September 30, 1930. The earnings for the 9 months ended September 30, 1931, were $666,135.65, or 99 cents per share, compared with $951,976.34 or $1.41 per share, during the same period in the year preceding.

The directors declared a dividend of 40 cents per share, payable December 15, 1931, to stockholders of record at the close of business November 30, 1931.

New Incorporations

Brassbestos Brake Lining Co., Oct. 31 (N. J.), 1,000 shares common. Principal office, Preakness Ave., Totowa, N. J. C. Borahs, 656 McBride Ave., W. Paterson, B. C. Bullen, 148 Hamilton St., and J. Meister, 57 Rossiter St., both of Paterson, all in N. J. To manufacture belting, packing, and molded and woven products.

Maxwell Rubber Products Corp., Oct. 22 (N. J.), 200 shares common. Principal office, 42 Oak St., Belleville, N. J. M. Andors, B. Foelak, H. Mendelsohn, and L. Yanpole, all of 278 Fifth Ave., New York, N. Y. To manufacture rubber toys and various other rubber goods.

The New England Rubber Co. of Beverly (Mass.), 500 shares, no par value. F. A. Ogden, Beverly, E. T. Feinberg, Boston, and F. J. Gleason, Cambridge, all in Mass.

Rex Fire Hose Mfg. Co., Oct. 29 (N. J.), $10,000. Principal office, 195 South First St., Clifton, N. J., R. H. Jacobs, H. F. Harwood, and P. Tomnie, all of 418 W. 27th St., New York, N. Y. To manufacture fire hose.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Boston Woven Hose & Rubber Co.	Pfd.	$3.00 s. a.	Dec. 15	Dec. 1
Boston Woven Hose & Rubber Co.	Com.	$0.50 q.	Dec. 15	Dec. 1
Firestone Tire & Rubber Co.	6% Pfd.	$1.50 q.	Dec. 1	Nov. 15
Plymouth Rubber Co.	Pfd.	$1.75 q.	Oct. 15	.....
Raybestos-Manhattan, Inc.	Com.	$0.40 q.	Dec. 15	Nov. 30

CANADA

Manufacturers have considerably reduced garden hose prices for 1932. Prices are guaranteed against decline until June 30, 1932, on all orders placed before December 31, 1931.

The usual fall expansion in sales of radio batteries is under way now as dealers take their initial supply into stock. Battery operated radio sets are being improved for the winter season. Through the introduction of 2 new batteries and improved receiving sets, radio manufacturers anticipate a widening of their market in rural districts where electricity is not available.

Unofficial reports from a private source state that a large Belgian manufacturer of zinc oxide plans to establish a plant in Canada. Information has also been unofficially received that one of the largest manufacturers of lithopone in the United States plans to locate in Eastern Canada. The Dominion has been using increasing quantities of zinc oxide and lithopone during recent years not only for making paint, but also for use in the rubber industry. The establishment of these plants in Canada is not regarded as unlikely by paint manufacturers especially in view of the recent exchange and tariff situation.

G. S. Whitby, of the National Research Council, Ottawa, received the honorary degree of Doctor of Laws from Mount Allison University at the opening of its new Science Building.

Exide Batteries of Canada, Ltd., Toronto, Ont., has completed plans for a factory and offices for a Montreal branch. Tenders will be called shortly.

Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., last month through President and General Manager, E. W. BeSaw, reported that manufacturing has been resumed at full capacity. Instead of 3 8-hour shifts daily, the men will work on 3 6-hour shifts, giving each employe 30 hours a week. The company intends to carry out this program for the entire winter. Preference will be given to men who have worked for this company before, when applications for jobs are being considered. The company also announced the following changes in its staff of district managers. H. J. Morrow, formerly district manager at Toronto, has been transferred to Regina to supervise sales in Saskatchewan and Alberta. His former position goes to J. R. Cuthbertson, of the Toronto sales staff. Fraser Jamieson is district manager for British Columbia, including Vancouver Island. Wm. McIlveen is district manager for the Province of Manitoba and Western Ontario to Head of Lakes.

W. F. Smith, representative of Ames Holden McCready Rubber Co., Ltd., Kitchener, Ont., who carries Smart Step shoes in Northern and Western Ontario, had an accident some weeks ago, in which he suffered a broken ankle. He has made very good progress to date and expects soon to be on the road again.

Dunlop Notes

At a meeting of the board of directors of the Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., A. B. Purvis was elected president to succeed the Hon. E. B. Ryckman, K.C.M.P., who retired as Dunlop president upon his appointment as Minister of National Revenue in the Bennett Government. Mr. Purvis is also president and managing director of Canadian Industries, Ltd., which has a large interest in the Canadian Dunlop Company. The other officers of the Dunlop company remain as before: The Right Hon. Sir Eric Geddes, chairman of the board; J. Westren, vice president and general manager; A. E. King, assistant general manager and secretary-treasurer.

Mr. Purvis denied reports that the du Pont interests had purchased control of the Dunlop company. The common stock of Dunlop, he said, is held, approximately, two-thirds in England and one-third by Canadian Industries. There is neither the suggestion or intention of such a purchase, Mr. Purvis declared.

Mr. Purvis also denied the statement that the du Pont interests controlled Canadian Industries. The great majority of the preferred stock of Canadian Industries, Ltd., is held in Canada, and the majority of the common stock, the only other outstanding issue, is held in the British Empire by Canadian and English stockholders.

"It is true," he added, "that the du Pont company holds stock in Canadian Industries through a Canadian company, Associated Securities of Canada, but this du Pont holding is a minority one."

Mr. Westren also emphatically denied the reports.

Dunlop in newspapers all over the Dominion advertised its Cleated Griptire, the Special Dunlop Winter Tire. The company also has been featuring the Cataract, a new one ply braided cord hose in the low price market. The company is also boosting Flexicord, a 2-ply "extra strength cord braided to exacting specifications." Imperial, Banner, and Gibraltar are other lines made by this company. At this season of the year Dunlop Shield Road races, attracting much attention, are being held all over Canada.

Dunlop's Tennis and Badminton Divisions are calling on the trade throughout Canada with a range of badminton racquets, shuttlecocks, and allied lines. This action represents the initial attempt of the English Dunlop company to market its badminton sports goods, which are being favorably received.

Canadian Goodrich Co., Ltd., Kitchener, Ont. So successful was its last year's Christmas Window Display Contest that Goodrich is repeating it this season. Cash prizes totaling $175 are awarded successful winners. In addition every dealer who submits an acceptable photograph receives a genuine Waterman pencil.

National Shoe Retailers will hold its annual convention at the Royal York Hotel, Toronto, Ont., January 11 and 12.

H. J. Philip has been transferred to Montreal as manager of the eastern division for the Viceroy Mfg. Co., Ltd., Toronto, Ont.

Seiberling Rubber Co. of Canada, Ltd., Toronto, Ont., according to Vice President and General Manager C. A. Jones, will introduce the Seiberling air cooled tire in Canada and will manufacture it in the Toronto factory. Molds and other equipment for the new tires are now being installed in the Canadian plant, and production will be under way in time to supply dealers early in January. Two lines of air cooled tires have been developed by Seiberling—the triple-tread and the duo-tread, in all sizes for passenger and commercial motor vehicles. In Canada the company will specialize on the 6-ply duo-tread, which, as the name implies, has 2 treads. As the outer tread wears off, a second tread appears and lasts down to the carcass.

The company has arranged in cooperation with its dealers throughout Canada for a weekly broadcast over 26 Canadian stations to last 26 weeks starting this month. More money will be spent this year in advertising than ever before. This company this year increased its dealer business in spite of a decline in dealer business in the industry.

Seiberling has decided to reopen its plant on Paton Rd., Toronto. Mr. Jones reports it will be busy during the balance of the year, and that with the turn of the year the plant will go back into full operation, employing 400 workers.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., is experimenting with the application of tires similar to Goodyear Airwheels. The tire is already in use on tractors.

An interesting comparison of the greater cushioning and easier riding qualities of the new Airwheel type tire with the balloon tire in present use on automobiles and trucks is that the new large tire has a greater air volume, but requires only 10 to 20 pounds pressure, while the present balloon calls for from 32 to 40 pounds.

Airwheel type balloon, moreover, offers from 2 to 2½ times more surface to the road with greater resultant traction, and it has greater antiskid properties on wet pavements.

Goodyear dealers now have a rubber chain to fit 4.75-19 tires, which gives them a well rounded out line to compete with steel chains.

Charles S. Watson, Goodyear advertising manager, recently was elected Canadian representative on the board of governors of the Direct Mail Advertising Association, later confirmed as first vice president at the recent convention of this organization held in Buffalo, N. Y., U. S. A.

Rubber Industry in Europe

GREAT BRITAIN

Managing Director British Firestone

Inherent ability and hard work have won for William E. Duck the enviable post of managing director of the Firestone Tyre & Rubber Co., Ltd., England. As he is still young, even greater things can be visualized for this executive.

Although born in England in 1894, Mr. Duck received his formal higher education in the United States, being graduated from the Baltimore Polytechnic Institute, Baltimore, Md., in 1915. He has been with the Firestone Tire & Rubber Co. since early in 1916, and in 1922 he left the position of district manager in Philadelphia to take charge of the British business.

Mr. Duck may be reached at the organization's offices, Gt. W. Rd., Brentford, Middlesex, England.

Wm. E. Duck

Shoe and Leather Fair

During the first week of October the Thirty-second Shoe and Leather Fair was held at the Royal Agricultural Hall at Islington, London, where rubber goods were prominently and attractively displayed. The unusual number of foreign visitors drew attention, and an unmistakable note of optimism prevailed; while various encouraging orders were placed.

Several new lines and novelties were shown. Charles W. Baker exhibited Tretorn footwear, including "Glovette," a close-fitting overshoe, and also a new rubber bathing shoe from the Continental company of Hannover, Germany.

The Bank Bridge Works, Ltd., Clayton, Manchester, had a great variety of heels, soles, and soling materials on view. This firm secured what is said to be the biggest single order for soles of rubber compound ever given: namely, 500,000 pairs, for the Impregnable Boot Co., Rushden.

The Dunlop company displayed footwear suitable for all occasions. Delatop boots and Delashield gaiters for winter wear have concealed lightning fasteners. A novelty worth mentioning is a cream for sport shoes in which latex is used. The advantage is that the cream cannot rub off, as it becomes bonded to the fabric: therefore, a single application lasts much longer than ordinary shoe cream.

The I. T. S. Rubber Co. displayed Itshide soling material and soles, including a new football sole with screw-on studs.

The Palatine Heel Branch of the Leyland & Birmingham Rubber Co. showed crepe-soled hiking shoes, a molded one-piece low-heeled beach shoe, in various colors, and a folk-dancing shoe in blue and red with crepe sole and flexible insole. This concern stated that wholesalers are taking greater interest in British-made goods and seem willing to cooperate with the manufacturer in plans for improving trade.

The North British Rubber Co. featured its "Scotia" molded sports shoe, made in one piece in special compressed-air molding machines with the aid of an airbag. "Scotia" is available for men, women, and boys. "Made like a tire, wears like a tire," reads its advertising slogan.

Frank Pike & Co., Ltd., presented "Hevea" tennis shoes with vulcanized crepe soles, and walking shoes, made at Heveadorp, Holland. They are press-molded and hot vulcanized in one piece. To insure that they keep their shape permanently a patented spring steel shank is embedded in the waist of the shoes.

Decidedly interesting were the new Phillips rubber cushion heelgrips fitting inside the shoe. The heelgrips are to be solutioned on and will remain securely attached as long as the shoe lasts. A complete outfit comprises a pair of grips, tube of solution, glass paper and instruction sheet, all packed in an attractive carton.

A close fitting Wellington boot for women, the new Hood Flexi-boot, was featured by C. W. Randall & Co., distributer for the Hood Rubber Co. The lower part of the boot is as strong as an ordinary Wellington, but the leg is of lighter fabric material coated with rubber. To provide adequate ventilation the leg covering is provided with minute perforations which open and close with the movement of the leg, causing automatic ventilation and minimizing condensation. Since the perforations are so minute, rain and snow are excluded. The Flexi-boot comes in two colors, black and fawn, and can easily be folded to fit into a small space.

The Rubber Growers' Association displayed crepe-soled footwear, including a wide array of sandals for children. Good work was done by the Association in giving frequent demonstrations of the latest methods of repairing crepe-soled footwear.

Institution of Rubber Industry

Ernst A. Hauser discussed "Latex versus Crude Rubber" at the second annual meeting of the Scottish Section of the Institution of the Rubber Industry in Edinburgh on October 13, 1931.

On October 22 B. W. Dunsby read a paper, "Inner Tubes for Pneumatic Tires," before the I. R. I. Midland Section at Leicester.

Other I. R. I. meetings occurred on November 5, at Birmingham, by the Midland Section, when G. C. Stone presented a paper, "Costing in the Rubber Industry;" on November 4, by the West of England Section, at Trowbridge, when Dr. Pickles discussed "The Simple Chemistry of Rubber Manufacturer;" on November 2, in Manchester, when L. Gaisman dealt with "Rubber Roadways;" and on November 18, when the Scottish Section heard a paper by A. Hughes on "Labor Wages in Relation to Other Charges."

The Institution of the Rubber Industry has now established a definite link between the rubber trade schools in England and the Institution by means of its Licentiateship, primary object of which is to encourage junior men, whether already engaged in the industry or about to enter it, to equip themselves for their future career by pursuing systematic courses of study at approved institutions.

The regulations apply to two licentiateships, one in science and the other in general rubber technology. In this connection with the educational program of the Institution, classes in rubber chemistry and technology are being regularly conducted in Great Britain at the following schools: Northern Polytechnic, Holloway, London, T. J. Drakeley, principal; Newton Heath Technical School, Manchester, R. Saunsbury, principal; Aston Technical College, Birmingham, R. Butler, principal; The Allan Glen Technical School, Glasgow, Dr. Steel, principal; Wolverhampton Technical College, Wolverhampton.

New British Tariff

The new 50 per cent British tariff now in effect and designed to prevent dumping applies to "Class Three Imports," which cover essentially all manufactured articles excepting food and applies to articles wholly or partially manufactured outside of the country. Goods from the Dominions will enter free. Thus American firms operating plants in Canada will benefit.

The order applies chiefly to the cheaper classes of goods and of rubber articles including tires and tubes for cycles, other than motor cycles, also heels and soles wholly or partly of rubber not attached to boots and shoes.

Latex Thread

Round rubber thread made by extruding latex is in demand by the knitting industry, for the new thread presents several advantages. In the first place extremely fine counts can now be obtained, the round threads being spun as fine as 100's for special fine gages. The new thread shows greater resistance to the high temperatures at which knitted fabrics are frequently laundered. In the fine counts the threads can be knitted into the fabric in ordinary loop formation; while the coarser threads, suitably covered, are laid into the fabrics at a neutral tension between 2 sets of loops so as to be obscured in the fabric except when drawn out in width. Round yarns are easier to work on the needles and can be made up into hanks of any required length, whereas the square thread is restricted to 70 yards.

Tested for the breaking load and extension, 1 in. lengths of round rubber yarns of the stouter counts were found to be extensible to more than 6 times their original length before breaking. This varied but little until the fine sizes were reached, the finest samples being stretched to something more than 3 times the original length before breaking.

FRANCE

International Conference

At the end of September an International Congress for developing new uses of rubber was held in Paris. Following so soon upon the International Rubber Conference in June in Paris and the meeting of the Deutsche Kautschuk Gesellschaft in May, it is not surprising that the conference was not so successful, and little that was new was heard.

F. Jacobs read a paper on the "Resistance to Prolonged Exposure to Light of Vulcanized Rubbers Colored with Organic Colors." Dufraisse and Drisch discussed the bad effect of litharge in connection with the autoxidation of rubber. They concluded that litharge is a prooxygen and not an antioxygen. Max Forrer in his paper "The Possibilities of Developing the Use of Rubber in Manufacturing Insulations," disclosed that the use of ebonite is decreasing in favor of synthetic resins. R. Fric reported on "Some Experiments in Vulcanization with Trinitrobenzene," which was in fact a checking up of the results obtained by Ostromislensky. According to Fric the reenforcing action of various fillers differs from that with sulphur, and he has not been able to obtain a product analogous to ebonite; finally the figures for resistance which he cites differ considerably from those reported from America.

Professor Bruni probably had most of interest to say. Besides a repetition of the paper on the "Minimum Amount of Sulphur Required for Vulcanization," he discussed "Fluorescence and the Study of Rubber Compounds," and "Direct Use of Latex in Manufacturing Rubber Goods." In the method evolved after years of experiments in the laboratories and the workshops of the Pirelli company in connection with producing latex articles, the basic principle is the use of salts of alkaline earths (alkaline earthy salts). But instead of inducing the latex to turn completely into a jelly, the concentration is effected on the surfaces of the work, molds, or drawplates. If preliminary suitable adjustments are made, ordinary latex, Revertex, Jatex, or even Vultex may be used. Professor Bruni showed a number of articles made by this process, which are usually made by dipping or molding as: gloves, finger cots, advertising balloons, bathing caps, hot water bags, tubes and inner tubes for automobiles and bicycles, etc. All of these products, it was stated, have been manufactured on a commercial scale.

At the end of the congress Professor Bruni proposed two resolutions, which were adopted: first that public administrations bring their specifications up to date; and the establishment of an organization like the United States Bureau of Standards.

Velousine

Velousine, as *India Rubber Journal* learns, is a new product now made in Paris under English supervision. It is a fabric treated with latex on one side, to which a pile of pure silk is applied. The material has a velvet surface, is attractive and waterproof. The pile is particularly tenacious; its appearance is unaffected by moisture or abrasion. In France the cloth is already being used for waterproof garments, shoes, dressing-case covers, millinery, and upholstery. The price is equivalent to about 5 shillings per yard; and in England several thousand yards have already been ordered. The paper quoted above believes that a small syndicate is being formed to exploit the process in Great Britain.

GERMANY

Import and Export Statistics

For the first 9 months of 1931, German crude rubber imports came to 348,115 quintals, value 26,949,000 marks, against 399,148 quintals, value 58,161,000 marks for the corresponding period of 1930. Reexports were 39,273 quintals, value 3,666,000 marks, against 37,810 quintals, value 5,786,000 marks in the same period 1931 and 1930, respectively, so that the actual consumption, omitting stocks, was 308,842 quintals, value 23,283,000 marks, against 361,338 quintals, value 52,375,000 marks.

Not only do the figures for crude rubber consumption show a marked decrease, but also those for imports and exports of manufactured goods. To be sure, rubber goods exports for September increased from 16,190 to 19,474 quintals, but for the 9-month period January to September, there was a noteworthy drop—from 165,133 quintals in 1930 to 149,580 quintals in 1931. The decline was still greater in the values of these exports, from 86,900,000 marks in 1930 to 69,327,000 in 1931. Hard rubber goods exports slightly increased, probably because of the sudden spurt in September when the figure rose from 518 to 974 quintals; while the total for the 9 months under consideration was 8,881 instead of 8,661 quintals.

The imports of rubber goods appear to indicate a progressive decline. Whereas they were 4,609 quintals in September, 1930, they fell to 2,550 quintals in September, 1931; while for January-September the decrease was from 56,701 quintals, value 27,848,000 marks, to 36,415 quintals, value 16,952,000 marks.

Lining Hollow Bodies

In lining hollow bodies, especially with hard rubber, in accordance with a recent patent obtained by Hermann F. W. Menzel, a pre-formed rubber cover is first mounted on a suitable core, introduced into the article to be lined, and the rubber cover is then inflated to fit against the interior walls of the hollow body. During the process of inflation the space between the rubber lining and the walls of the hollow body is exhausted by compressed air led through the core. The rubber lining may be sprayed onto the core or formed on the core from strips of unvulcanized rubber. The advantage claimed for the process is that it permits large deep surfaces, as for instance very long and wide sections of piping, to be covered internally with a thin, even lining of hard rubber.

Spreading with Dispersions

The Metallgesellschaft A.G., Frankfurt a. M., has obtained a patent for a process by Gerhard Warnke in connection with the spreading of fabrics with dispersions of rubber or of rubber substitutes. In this process the fabric, after being led into the container with the rubber dispersion, passes through 2 pairs of soft rubber rollers, the first pair being provided with grooves parallel to the axis, run in the direction opposite to the fabric, thus causing a rubbing action parallel to the course of the fabric. The second pair of rollers have grooves perpendicular to the axis and so they not only revolve about the axis but have a to-and-fro movement in the axial direction, thus producing a rubbing motion perpendicular to the direction of the fabric. To obtain coatings free from air the spreading device may be enclosed partly or entirely in an air-tight housing and placed under a vacuum.

The aim of the process is to bring to bear upon fabric and coating a rubbing movement by which a very much better adhesion is secured.

The special advantages of the process are particularly noticeable when aqueous dispersions of rubber and rubber compounds with aqueous dispersion agents are employed.

FINLAND

Exports of Nokia rubber goods by the Suomen Gummitehdas Osakeyhtio have considerably increased. Whereas the total foreign sales during the first 8 months of 1931 were 168,757 kilos, value 8,200,000 marks, they were only 115,823 kilos, value 7,600,000 marks, for the same period of 1930.

Rubber Industry in Far East

NETHERLANDS EAST INDIES

Seventh Native Report

The "Seventh Report on Native Rubber," just issued, calls attention to the fact that despite the low rubber price of 2d. per pound, native rubber exports continue their upward trend. Some of the causes for this situation mentioned in an earlier report were: the scarcity of money among the natives, coupled with their obligation to pay heavy taxes besides the sums required to release them from forced labor; and the general lowering of living standards which makes small earnings sufficient to cover much more modest needs. But in the meantime other factors have entered into the question: the greatly increasing potential output estimated at 150,000 tons for 1930 and 200,000 for 1931; the fact that the prices for other native products have declined in price, so that rubber, which is easy to harvest, continues to be preferred to other commodities; the circumstance that on the whole the decline in the price of standard quality has been more considerable than that of medium blanket. This factor is important and appears to indicate that the consumers, chiefly in America, entertain some fear that a large part of the native rubber, which they need for mixing with the harder standard qualities, might disappear from the market.

Finally is the equally important factor of the competition among the remilling factories, particularly among the Singapore remillers, who owing to reduced supplies have been forced to quote the highest prices possible while they have had to cut operating costs drastically. Several remilling factories in Singapore have ceased working. Whereas, costs were $1.50 per picul (133⅓ pounds) some years ago, they are now 80 cents per picul (Straits currency).

The total exports of native rubber for the first half of 1931 declined 9.6 per cent as compared with the corresponding period of 1930, that is 46,711 tons calculated dry against 51,703 tons dry. Compared with the second half of 1930 the figure for 1931 indicates an increase of not less than 25 per cent as in the latter half of 1930 exports were 37,217 tons dry. However if the actual outputs in the first 6 months of 1931 are compared with the potential output for the period, a very considerable decrease is noted; for the whole of 1930 the real output was 60 per cent of the potential output, but in the first half of 1931 the ratio was only 47 per cent.

A feature of the native exports is the increasing proportion of dry rubber. In 1931, 12,312 tons or 26.3 per cent of the total exports were shipped dry. In the first half of 1930 dry shipments were 11,546 tons, and even in the second half of 1930, when the total exports declined sharply, the amount of rubber exported in a dry state was 9,807 tons, indicating that despite keen competition, the local rubber remillers are maintaining themselves against Singapore.

Finally attention is called to the differing tendency of production of Malayan native rubber as compared with Dutch native rubber. During the first and second semesters of 1930, when Dutch native outputs showed a drop during the latter period as against the first, from 51,703 to 37,217 tons, Malayan native outputs were fairly stable at 110,168 and 109,689 tons, respectively; but while Dutch native production went up sharply to 46,711 tons in the first half of 1931, after the drop mentioned, the Malayan native outputs took an opposite trend, falling to 98,900 tons. These figures, incidentally, illustrate the comparatively greater importance of the native rubber industry in Malaya.

Packing Rubber

J. van Baalen, manager of the Bergen Estate, submits an economic method of packing crepe rubber, which is of special interest at present when it is so important to save wherever possible.

Hitherto the usual custom has been to fold the dry crepe rubber to size; then pack it in cases lined with other sheets of crepe, and finally to compress the crepe in the case. By this method the standard weight per case measuring 19 by 19 by 24 in. was 75 kilos of crepe.

But van Baalen found that by taking a few unfolded sheets or one folded sheet of crepe and passing them through the rollers, giving extra compression, and then after packing again and compressing in the usual way, 75 kilos could be accommodated in a case of the customary dimensions, without bulging at the sides, and 90 kilos could be packed in these cases with less bulging than when 75 kilos are packed under present methods. The saving per case on freight and packing charges is shown to be 0.86 gilders, and after deducting an allowance of 14 cents per case for extra labor and power required by the new method, the net saving is 0.72 gilders per case of 90 kilos, or 0.8 gilder cents per kilo.

To discover the opinion of buyers concerning rubber when packed in this way, samples were sent to the Rubber Experiment Station and to brokers in Batavia and Singapore. The Experiment Station reported that, while the inner qualities had not been affected, the Netherlands Indies Rubber Trade Association, to which the samples were passed on, nevertheless unanimously believed that rolling the dry rubber had so far reduced the quality that the product would fetch one cent per half kilo less than standard crepe; and a similar opinion was given by the two Batavia brokers. But the report from Singapore said that samples had been submitted to Goodyear and Goodrich representatives who had no objection to the rubber and would pay the same price as for standard sheet and would pay no more for standard crepe than for rubber like the sample.

Van Baalen concludes with the just remark that the Batavia market will have to adjust its requirements as to quality and will have to support all measures which are necessary to cut costs.

Tapping Systems

Mr. van Baalen is also the author of a lengthy article, well supported by numerous graphs and tables, covering his experiments with 5 different tapping systems. These tests have now been running for 6 years, and a feature to be noted is that special attention is given the reaction of individual trees to various methods of tapping.

The 5 systems employed were: alternate daily with ½ cut; alternate daily with ⅓ cut; every third day with ½ cut; periodical tapping for 20 days with ½ cut; and periodical tapping over 30 days with ⅓ cut.

The more severe systems altogether gave 13½ per cent more output during the 75 months of the test than the lighter systems. The last year of the experiments, however, saw the yields for all systems become practically equal. The periodical systems gave over 4½ per cent more rubber over the 75 months referred to than the alternate daily systems.

Observations made during the last year showed that the respective periods selected in periodical tapping, 20 and 30 days, actually were the most economical that could have been chosen for these systems.

Apart from the harm done to the trees, tapping in the morning and again in the afternoon is condemned as being uneconomical. The afternoon crop is only 50 per cent of the normal yield; while the bad effect of the second tapping continues to be noticed for 3 days following.

The author appears to be very much impressed by the importance of brown bast which he considers is the final determining factor in the yield capacity of trees; while lengthening of cuts, tapping with several cuts, decreasing the tapping tasks, etc., in attempts to increase yields, are of secondary importance.

Finally he concludes that in view of the present wretched prices obtained for rubber, the heavier tapping systems should be abandoned by estates and the A.B.C. tapping method with ½ cut introduced instead. In this way the cost of management will be decreased and at the same time, for the first years at any rate, considerable quantities of rubber will be held back, which check cannot but have a favorable effect on the price of rubber.

MALAYA

International Research Association

Attention has been focused here on an article by W. J. Gallagher in the *Bulletin of the Rubber Growers' Association* that dealt with the need of balanced research. Mr. Gallagher formerly was director of Agriculture, F. M. S., and for many years a vice president and managing director of the United States Plantations, Inc., known as the H.A.P.M.

In the article mentioned he drives home the point that whereas producers spend large sums of money in maintaining research organizations to increase the output of rubber, and rubber manufacturers provide still greater amounts for maintaining laboratories where highly trained men work to prolong the life of manufactured rubber goods, comparatively little money has been given for creating new uses for rubber.

To quote the writer: ". . . at opposite ends of the broad field of the rubber industry there are two active concentrations for research; while there is missing in the middle a concentration that ought to be as big as these two together. What is lacking is an International Rubber Research Association that would investigate the consumption of raw rubber and devise ways and means of creating new wants as well as new uses for rubber."

The work of the Rubber Growers' Association Propaganda Committee, he claims, has been hampered by lack of funds. What is needed is strong and sustained effort to find new rubber uses of wide application. This could be conducted by a properly financed research association, in which British, Dutch, and French would cooperate. Such an association could be supported by funds obtained from the collection of a tax in the producing countries particularly British and Dutch. Assuming an export from the East of 800,000 tons yearly, then an export tax of only one-hundredth of a penny per pound would produce about £75,000, which would be sufficient to meet initial requirements. Forming such an organization is left to the R. G. A.

On reflection, the program proposed by Mr. Gallagher is a large order. To find new uses of *wide* application, to enter occupied fields, and to displace other raw bases sounds definite enough. But let this aspiration be compared to what is demanded of the scientists working in the producing centers to increase outputs and of those working in chemical laboratories to improve the qualities of articles manufactured. In each case the scientist knows definitely what he is required to supply and can work with a well-defined purpose because he has to deal only with such objects as trees, soils, fertilizers, chemicals, and raw materials. But those who are required to solve the problem Mr. Gallagher puts before them have to deal with human beings, their prejudices, institutions, and conditions; and because of their complexity it is hardly to be expected that research will methodically and rapidly dispose of these factors and solve the question of developing needs and invading new fields.

A new article with great potentialities, may be invented, but until its full development is assured the article remains ignored. Take tires for example. A pneumatic tire was invented many years before Dunlop had the same idea, but the former never made any headway. Even after Dunlop developed the pneumatic tire there was no demand for it, and it was not until road construction had been improved and the automobile perfected that the tire industry received the proper stimulus.

Budgrafting

The Department of Agriculture, S. S. and F. M. S., has published some worth while data regarding the areas under budgrafted rubber in these territories. Information regarding the Unfederated Malay States at present is not available, and the figures now given refer only to estates of 100 acres and over.

At the end of 1930 the total acreage of budgrafted rubber in the F. M. S. was 51,736 and in the S. S. 5,229, that is altogether 56,965 acres, distributed over a total of 265 blocks. These blocks range from plots under 10 acres, of which there were in all 50 with a combined area of 204 acres, to large plantations over 1,000 acres each. Of the latter class in all 9 covered a total area of 22,537 acres. The total area of blocks of between 100 and 500 acres each was 20,008 acres.

The oldest buddings are found in Perak and Selangor, F. M. S., and in Dindings, S. S., a total of 2,379 acres having been budded in 1922. Progress in budding was slow until 1926 when interest was renewed and development proceeded rapidly. This trend is illustrated in the following figures for the years 1922-30: 2,379 acres in 1922, 580 in 1923, 602 in 1924, 555 in 1925, 1,016 in 1926, 2,842 in 1927, 7,644 in 1928, 19,872 in 1929, and 21,475 in 1930. The greatest interest in budding seems to have been taken in Selangor from the start, but since 1927 much work has also been done in Negri Sembilan. Figures for the past 2 years reflect the tendency of some companies to turn to the comparatively undeveloped state of Pahang for new land.

The total area of budgrafted rubber that is in tapping is about 6 per cent of the total areas planted with budgrafts, that is 3,561, and more than half of this is in Selangor.

Most of the estates have used proven clones. The area planted with this material totals 51,288 acres; while the remaining 5,677 acres have been planted with unproven clones, from material from the estates' own nurseries.

Journal of the Rubber Research Institute

The editor of the *Quarterly Journal of the Rubber Research Institute* announces that in the future this journal will contain only the results of investigations carried out by members of the staff or articles on investigations specially contributed and approved. All abstracts or reviews of investigations conducted in relation to rubber cultivation, preparation, diseases, etc., in other producing countries will be published in the *Malayan Agricultural Journal*. Because of this decision it may be impossible to issue the journal quarterly; so it has been resolved to change the title from *Quarterly Journal* to *Journal of the Rubber Research Institute* and to issue numbers as and when material for publication becomes available.

The latest issue of the journal contains several interesting articles. Sanderson and Haines discuss the effect of covers and clearing methods on the growth of young rubber trees.

Tapping Budded Rubber

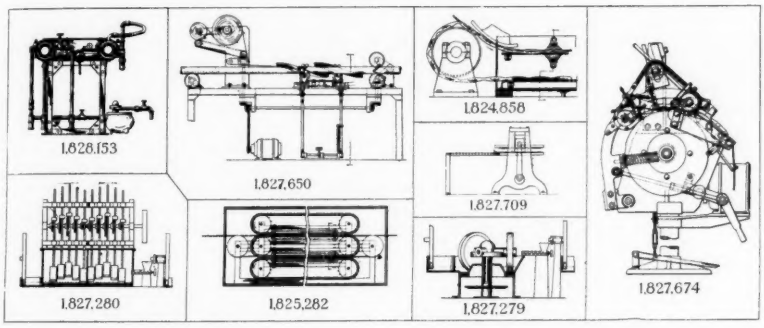
After a visit to Sumatra where Heusser's system of double tapping consisting of two stepped or echelon cuts on budded trees was seen, R. J. Chittenden, the botanical officer of the Prang Besar Estate, there started a similar experiment. Despite differences in environment and material the results were similar to those obtained by Heusser. Prang Besar clones 23, 24, 186, and 98 were chiefly employed in the tests, and the findings led to the conclusion that the first 2 clones cannot withstand a system more severe than a single cut over half the circumference alternate daily; while the 2 other clones might sustain a heavier tapping system since both withstood tapping on 2 half-cuts for 20 months. Clone 23, it is further added, appeared to respond particularly well to 2 cuts on a quarter, yielding at the rate of over 3 lbs. per tree more than on a single half cut.

The Heusser system, says Dr. Chittenden, appears to be particularly suitable since the latex zones tapped by each cut do not overlap and there is a free circulation of sap to the respective cuts. Slight disadvantages appear to be that possibly girth increase is not so rapid on trees on a double tapping system and that ladders are necessary for tapping. With regard to the latter disadvantage, experiments are now in progress on Prang Besar in which cuts are brought lower down the tree and closer together. So far no deleterious effects have been observed from this approximation of the cuts; so the ladder has been dispensed with.

Hevea Spruceana

Hevea spruceana has been found to grow well under soil conditions unfavorable to *Hevea brasiliensis*. Since its natural habitat is the flood plain in the upper Amazon valley, *H. spruceana* appears to be tolerant of conditions of poor soil aeration. These circumstances have led to the establishing of a supply of budwood of *H. spruceana* and it is intended to establish isolated seed gardens of *H. spruceana* alone and also mixed with *H. brasiliensis* to test the value of both the pure and the hybrid seedlings as stocks for budding with *H. brasiliensis*. *H. spruceana*, it seems, can be very successfully budded on *H. brasiliensis*. From 3 yards of budwood 96 vigorous young buddings were obtained.

Patents, Trade Marks, Designs



Machinery

United States

1,824,858.* **Conveyer Apparatus.** The object of this invention is to convey rubber tire tread stock from calender or tuber while it is wet for cooling and washing in transit. The construction of the conveyer includes rubber covering of all bearing surfaces. Thus when these surfaces are wet, they are effectually lubricated. W. K. Williams, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,825,282.* **Insulated Wire Vulcanizer.** By this apparatus the vulcanization of rubber covered wire is greatly simplified and materially hastened to the end that the resulting product is of uniform quality, more perfectly formed, and substantially reduced in cost. The wire after being covered in the usual way travels progressively through a chamber heated to vulcanizing temperature, meantime being subjected to mechanical pressure which contracts the rubber coating uniformly about the wire. W. J. Peelle, Chicago, Ill.

1,827,279.* **Pulp Refining Machine.** By this machine paper stock fibers are improved and vegetable fibers are hydrated while minimizing the shortening of the fiber length. The new method and apparatus also reduces the time for the beating treatment and produces a stock which improves the physical properties of the paper made from it. G. H. Carnahan, New York, N. Y., assignor to Rubber Surfacers, Inc., Wilmington, Del.

1,827,280.* **Pulping Machine.** According to this inventon the ordinary ore pulverizing stamp mill is adapted to the work of reducing vegetable fibers to suitable condition for paper making by employing resilient rubber surfaces for the striking parts of the ordinary stamp mill. G. H. Carnahan, New York, N. Y., assignor to Rubber Surfacers, Inc., Wilmington, Del.

1,827,650.* **Rubber Conduit Machine.** A pair of oppositely spiraled brushes are placed upon opposite sides of a mandrel and, owing to the resiliency of the bristles, they exert a resilient but uniform pressure against the mandrel. Thus, as the rubberized fabric is conducted between the brushes and the mandrel, it is folded about the latter and firmly pressed against it, producing a conduit form ready for vulcanizing. J. I. Haase, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,827,674.* **Belt Cover Flipper.** A strip of adhesive fabric to be applied as a cover to an endless belt serving as a core, is fed between the latter and a driving disk. At the same time stitching rollers and folding devices successively apply portions of the cover to the core. Any number of layers of covering material may be applied in this manner merely by winding it upon the core. J. A. Shively, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,827,709.* **Mat Cutter.** This invention provides a means whereby vulcanized floor mats for automobiles may be cut to fit the floor of the driving compartment of automobiles with properly located openings for the various operating levers, etc. The machine consists essentially of a fixed platen on which the mat to be cut is passed from a roller top table. The cutting die is attached to the movable top platen, and the cutting is effected by the downward stroke of the platen. W. H. Leavenworth, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,828,153.* **Inner Tube Vulcanizer.** Preformed annular shaped inner tubes are inflated in a steam jacketed tube mold. Provision is made that the portion which extends between the beads of the tire casing will be properly formed about the periphery of the tube. M. H. Pade, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,825,250. **Bias Cutter.** J. Rehak, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,825,616. **Vulcanizing Press.** R. J. Schmidt, assignor to Akron Equipment Co., both of Akron, O.

1,826,056. **Tire Cutter.** J. W. Denmead, Akron, O.

1,826,214. **Rubber Article Form.** E. Hopkinson, New York, N. Y., assignor to Morgan & Wright, Detroit, Mich.

1,827,232. **Tire Tube Tester and Bucket.** W. A. Henry, Hollywood, Calif.

1,827,637. **Airbag Buffer.** G. G. Andrews, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,828,126. **Time Controller.** R. W. Brown, assignor to Firestone Tire & Rubber Co., both of Akron, O.

Dominion of Canada

316,117. **Tire Flap Machine.** Goodyear Tire & Rubber Co., assignee of D. L. Williams, both of Akron, O., U. S. A.

316,382. **Vulcanizing Press.** Ohio Rubber Co., assignee of B. Bronson, both of Cleveland, O., U. S. A.

316,421. **Tire Cover Apparatus.** Dunlop Rubber Co., Ltd., London, N.W. 1, and Francis Shaw & Co., Ltd., Bradford, Manchester, assignees of H. Willshaw, W. A. Cowles, and H. Smith, co-inventors. all of Birmingham, all in England.

United Kingdom

352,075. **Shoe Vulcanizer.** H. C. L. Dunker, Helsingborg, Sweden.

352,270. **Footwear Mold.** H. C. L. Dunker, Helsingborg, Sweden.

352,540. **Pipe Cap Mold.** Victaulic Co., Ltd., London, and P. G. Johnson, Hertfordshire.

352,803. **Mixer.** D. A. Ducharme, Akron, O., and F. H. Banbury, Ansonia, Conn., both in the U. S. A.

Germany

535,876. **Vulcanizing Press Loading Plate.** G. Siempelkamp & Co., Krefeld.

535,877. **Mold.** Rhewum Rheinische Werkzeug & Metallwarenfabrik G.m.b.H., Remscheid-Luttringhausen.

536,772. **Hose Coupling.** J. E. Kruger, Bremen.

537,030. **Tube Press.** Dunlop Rubber Co., Ltd., London, England. Represented by R. and M. M. Wirth, C. Weihe, and H. Weil, all of Frankfurt a. M., and T. R. Koehnhorn, Berlin S.W. 11.

537,356. **Plastic Mill.** Fried. Krupp Grusonwerk A. G., Magdeburg-Buckau.

537,486. **Rolling Ends of Hollow Bodies.** Carl J. Schmid, Inc., New York, N. Y., U. S. A. Represented by B. Kugelmann, Berlin S.W. 11.

537,487. **Glass Dipping Mold.** Carl J. Schmid, Inc., New York, N. Y., U. S. A. Represented by B. Kugelmann, Berlin S.W. 11.

Designs

1,187,054. **Rubber Roughening Device.** J. Merly, Noeux les Mines, France. Represented by M. Abrahamsohn, Berlin-Neutempelhof.

1,188,697. **Shoe Upper Mold.** A. Wagener, Berlin S.W. 68.

1,189,214. **Shoe Repair Device.** J. Boder, Hirschberg im Riesengebirge.

1,189,850. **Portable Belting Vulcanizer.** M. Szurau, Berlin-Charlottenburg.

* Pictured in group illustration.

Process

United States

1,825,252. **Decorating Rubber.** B. S. Taylor, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,825,379. **Assembling Footwear Parts.** F. Zonino, assignor to Goodyear's India Rubber Glove Mfg. Co., both of Naugatuck, Conn.

1,825,827. **Fabric.** P. S. Smith, Madison, assignor, by mesne assignments, to Lea Fabrics, Inc., Newark, both in N. J.

1,825,871. **Assembling Shoe Parts.** F. D. Kinney, Wenham, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

1,826,092. **Insulated Wire.** H. De B. Rice, assignor to National India Rubber Co., both of Bristol, R. I.

1,826,240. **Anchoring Strands of Elastic.** L. B. Chisholm, assignor to American Mills Co., both of Waterbury, Conn.

1,826,706. **Sheet Roofing.** I. Davis, Marshalltown, Ia.

1,827,127. **Ornamenting Mats.** P. M. Weamer, Gladwyne, assignor to Lee Rubber & Tire Corp., Conshohocken, both in Pa.

1,827,233 and 1,827,234. **Spring Shackle.** V. Hughes, assignor to General Motors Research Corp., both of Detroit, Mich.

1,827,267 and 1,827,268. **Spring Shackle.** C. R. Short, assignor to General Motors Research Corp., Detroit, Mich.

1,828,365. **Heat Insulating Material.** H. D. Geyer, A. H. Flower, and J. C. Housekeeper, assignors to Inland Mfg. Co., all of Dayton, O.

1,828,481. **Article from Organic Dispersions.** G. W. Trobridge, Sutton Coldfield, E. A. Murphy, Birmingham, D. F. Twiss, Wylde Green, and W. G. Gorham, assignors to Dunlop Rubber Co., Ltd., both of Birmingham, all in England.

Dominion of Canada

315,668. **Tire Vulcanization.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of S. M. Cadwell, Leonia, N. J., U. S. A.

315,723. **Applying Rubber to Metal.** Michelin & Cie., Clermont Ferrand (Puy-de-Dome), assignee of A. J. Michelin, Paris, both in France.

315,798. **Attaching Rubber Plates to Leather.** K. Ehmke, Hamburg, Germany.

315,900. **Footwear.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of G. F. Gourley, Baldwin, N. Y., U. S. A.

316,286. **Separator.** M. Wildeman, Monte Carlo, Principality of Monaco.

Germany

535,636. **Seamless Joining of Fabrics.** Berliner Maschinen-Treibriemen-Fabrik Adolph Schwartz & Co., Berlin N. 65.

535,874. **Plastic Patterns.** Fromms Act Julius Fromm, Berlin N.O. 18.

537,031. **Soft Vulcanized Rubber.** Franz Clouth Rheinische Gummiwarenfabrik A. G., Koln-Nippes.

Chemical

United States

1,824,771. **Coating Composition.** E. P. Cox, Edgewood Arsenal, Md.

1,825,286. **Denture.** E. Roberts, Montclair, N. J., assignor to Naugatuck Chemical Co., Naugatuck, Conn.

1,825,288. **Accelerator.** W. Scott, Nitro, W. Va., assignor to Rubber Service Laboratories Co., Akron, O.

1,825,422. **Fibrous Material.** R. P. Rose, Jackson Heights, assignor to General Rubber Co., New York, both in N. Y.

1,825,515. **Aqueous Rubber Dispersions.** M. Forrer, Paris, France, assignor to Anode Rubber Co., Ltd., Guernsey, England.

1,825,625. **Rubber Latex Product.** W. C. Bennett, Hingham, assignor to Bennett Box Co., Boston, both in Mass.

1,825,654. **Antioxidant.** L. J. Christmann, Jersey City, N. J., assignor to American Cyanamid Co., New York, N. Y.

1,825,736. **Latex Manufacturing Process.** P. Klein, Budapest, Hungary, and A. Szegvari, Akron, O., assignors, by mesne assignments, to American Anode, Inc., a corporation of Del.

1,825,737. **Drying Aqueous Dispersions.** P. Klein, Budapest, Hungary, assignor to American Anode, Inc., Akron, O.

1,825,738. **Aqueous Dispersions of Dipped Goods.** P. Klein and F. Gábor, both of Budapest, Hungary, assignors, by mesne assignments, to American Anode, Inc., a corporation of Del.

1,825,771. **Abrasive Articles.** R. C. Benner, Niagara Falls, and G. H. Porter, La Salle, assignors to Carborundum Co., Niagara Falls, all in N. Y.

1,826,091. **Reclaiming Waste Rubber.** W. B. Pratt, Wellesley, Mass., assignor, by mesne assignments, to Dispersions Process, Inc., Dover, Del.

1,826,192. **Latex Treatment.** M. C. Teague, Elmhurst, N. Y., assignor to American Rubber Co., E. Cambridge, Mass.

1,826,275. **Chlorinated Rubber Product.** F. C. Dyche-Teague, London, England.

1,826,392. **Rubber Latex Preparation.** R. A. Dunham, Long Beach, assignor to Union Oil Co. of California, Los Angeles, both in Calif.

1,826,846. **Artificial Rubber.** E. Tschunkur and W. Bock, both of Cologne-Mulheim, Germany.

1,827,356. **Latex Binder.** A. Ferretti, Milan, assignor to Societá Invenzioni Brevetti Anonima-Torino, Turin, both in Italy.

1,827,604. **Vulcanization by Selenium.** B. W. Nordlander, Schenectady, N. Y., assignor to General Electric Co., a corporation of N. Y.

1,828,587. **Factice Manufacture.** J. Baer, Basle, Switzerland.

Dominion of Canada

315,579. **Printers' Blanket.** F. E. DeVries, Chicago, Ill., U. S. A.

315,743. **Printing Medium.** Rucel, Ltd., London, E. C. 2., assignee of H. N. Morris, Broxbourne, both in England.

315,781. **Electrical Insulation.** W. S. Smith, Newton Poppleford, H. J. Garnett, Sevenoaks, J. N. Dean, Orpington, B. J. Habgood, Bournemouth, and H. C. Channon, London, co-inventors, all in England.

315,783. **Chewing Gum Base.** J. O. Barker, New York, N. Y., U. S. A.

315,919. **Hard Rubber-like Mass.** I. G. Farbenindustrie A. G., Frankfort a. M., assignee of W. Zieser, Leverkusen, both in Germany.

316,091. **Rubber Dispersion Vulcanization.** Brown Co., Berlin, N. H., assignee of R. B. Hill, Peabody, Mass., U. S. A.

316,094. **Automobile Brake Composition.** Canadian Raybestos, Ltd., Peterboro, Ont., assignee of I. J. Novak, Bridgeport, Conn., U. S. A.

316,118. **Combined Softener and Activator.** Goodyear Tire & Rubber Co., assignee of C. W. Sanderson, both of Akron, O., U. S. A.

316,119. **Printers' Blanket.** Goodyear Tire & Rubber Co., assignee of W. C. Calvert, both of Akron, O., U. S. A.

316,148. **Latex-Grease Composition.** Shell Oil Co., San Francisco, assignee of E. N. Klemgard, Martinez, both in Calif., U. S. A.

316,152. **Vulcanized Rubber Foam.** La Société Belge du Caoutchouc Mousse, Société Anonyme, assignee of M. Raepsaet, both of Bercham-Ste.-Agathe, Belgium.

316,209. **Vulcanization of Isocolloids.** L. Auer, Budapest, Hungary, and N. Strachovsky, co-inventors, Manchester, England.

316,298. **Latex Composition.** Brown Co., assignee of W. B. Van Arsdel, both of Berlin, N. H., and R. B. Hill, Peabody, Mass., co-inventors, both in the U. S. A.

316,383. **Accelerator.** Ohio Rubber Co., Cleveland, assignee of C. F. Flemming, Willoughby, both in O., U. S. A.

316,389. **Accelerator.** Rubber Service Laboratories Co., Akron, O., assignee of W. Scott, Nitro, W. Va., both in the U. S. A.

316,393. **Latex-Grease Composition.** Shell Oil Co., San Francisco, assignee of E. N. Klemgard, Martinez, both in Calif., U. S. A.

United Kingdom

351,643. **Anti-Sticking Composition.** G. Uhl, Vienna, Austria.

351,937. **Porous Rubber.** Dunlop Rubber Co., Ltd., London, Anode Rubber Co., Ltd., St. Peter's Port, and E. W. Madge, Ft. Dunlop.

351,938. **Rubber Composition.** Dunlop Rubber Co., Ltd., London, Anode Rubber Co., Ltd., St. Peter's Port, E. A. Murphy and D. F. Twiss, both of Ft. Dunlop.

352,080. **Sticky Rubber Products.** Dunlop Rubber Co., Ltd., London, S. A. Brazier, E. H. Hurlston, and E. V. Bratby, all of Manchester.

352,167. **Vulcanizing.** J. Y. Johnson, London. (I. G. Farbenindustrie A. G., Frankfort a. M., Germany.)

352,506. **Coloring Rubber.** A. Carpmael, London. (I. G. Farbenindustrie A. G., Frankfort a. M., Germany.)

352,519. **Vulcanizing Mold.** Bakelite Corp., New York, N. Y., assignee of G. W. Crosby, Woodcliff, N. J., both in the U. S. A.

352,549. **Rubber Antiager.** A. Carpmael, London. (I. G. Farbenindustrie A. G., Frankfort a. M., Germany.)

352,568. **Accelerator.** A. Carpmael, London. (I. G. Farbenindustrie A. G., Frankfort a. M., Germany.)

352,746. **Accelerator.** Roessler & Hass-

lacher Chemical Co., New York, N. Y., U. S. A.

352,781. **Age Resister.** Imperial Chemical Industries, Ltd., London.

352,829. **Vulcanizing.** Soc. Italiana Pirelli, Milan, Italy.

353,194. **Polymerized Vinyl Derivative.** G. B. Ellis, London. (Soc. des Usines Chimiques Rhone-Poulenc, Paris, France.)

353,311. **Chlorinated Rubber Compositions.** M. Deseniss and A. Nielson, both of Hamburg, Germany.

353,493. **Sound Record Composition.** Koppers Co., Pittsburgh, assignee of H. J. Rose, Penn Township, both in Pa., and W. H. Hill, Arlington, N. J., all in the U. S. A.

353,495. **Roofing.** Koppers Co., Pittsburgh, assignee of H. J. Rose, Penn Township, both in Pa., and W. H. Hill, New York, N. Y., all in the U. S. A.

353,524. **Rubber Emulsions.** Dunlop Rubber Co., Ltd., London, Anode Rubber Co., Ltd., St. Peter's Port, and F. H. Lane, Ft. Dunlop.

353,580. **Accelerator.** Imperial Chemical Industries, Ltd., London, H. M. Bunbury, W. J. S. Naunton, and W. A. Sexton, all of Manchester.

353,871. **Accelerator.** Dunlop Rubber Co., Ltd., London, D. F. Twiss and F. A. Jones, both of Ft. Dunlop.

353,876. **Concentrating Latex.** J. Aumarechal, Boulogne-Sur-Seine, and G. Robrieux, Paris, both in France.

353,947. **Printing Blanket Composition.** Dunlop Rubber Co., Ltd., London, S. A. Brazier and F. W. Warren, both of Manchester.

Germany

535,536. **Accelerating Vulcanization.** Silesia, Verein Chemischer Fabriken, Ida & Marienhutte bei Saarua, Kr. Schweidnitz.

535,687. **Producing Conversion Products of Rubber.** I. G. Farbenindustrie A. G., Frankfurt a. M.

536,120. **Improving Rubber Goods.** Technische Chemikalien-Co. G.m.b.H., Halle a. d. S.

536,383. **Vulcanization Products.** I. G. Farbenindustrie A. G., Frankfurt a. M.

536,678. **Vulcanizing Process.** Rubber Service Laboratories Co., Nitro, W. Va., U. S. A. Represented by A. Mestern, Berlin S.W. 48.

537,032. **Coagulating Latexlike Emulsions of Butadiene Hydrocarbons.** I. G. Farbenindustrie A. G., Frankfurt a. M.

537,033. **Hardening Products of Diolefines.** I. G. Farbenindustrie A. G., Frankfurt a. M.

537,034. **Gutta Percha Substitute.** E. S. Ali-Cohen, The Hague, Holland. Represented by F. During, Berlin S.W. 61.

537,035. **Making Rubber Masses.** I. G. Farbenindustrie A. G., Frankfurt a. M.

General

United States

1,824,815. **Tire Antiskid Device.** F. Fuchs, Vienna, Austria.

1,825,003. **Traffic Marker.** J. A. Ledoux, Worcester, Mass.

1,825,186. **Horseshoe.** P. A. Harsem, Oslo, assignor to Imperator Hestesko A/S., Tonsberg, both in Norway.

1,825,266. **Rule and Compass.** A. A. Fischer, Bensenville, Ill.

1,825,276. **Overshoe.** L. H. L'Hollier, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,825,308. **Inflatable Hollow Body.** I. and L. Dorogi, both of Budapest, assignors of ½ to Dr. Dorogi Es Tarsa Gummigyar, R. T., Budapest-Albertfalva, all in Hungary.

1,825,329. **Airplane Article Pickup Device.** L. S. Adams, New York, N. Y.

1,825,339. **Dosing Device.** A. T. Davenport, Washington, D. C.

1,825,352. **Spring Shackle.** A. J. Jansson, Flint, assignor to General Motors Corp., Detroit, both in Mich.

1,825,376. **Wiper Blade.** S. P. Vaughn, Ackerman, Miss.

1,825,391 and 1,825,392. **Steering Wheel.** H. D. Geyer, assignor to Inland Mfg. Co., both of Dayton, O.

1,825,499. **Sink Stopper.** F. Zorn, New York, N. Y.

1,825,530. **Car Axle Mounting.** E. Latshaw, assignor to J. G. Brill Co., both of Philadelphia, Pa.

1,825,692. **Heel.** A. C. Hayden, Brockton, Mass.

1,825,924. **Webbing.** G. H. Sauermann, assignor to Russell Mfg. Co, both of Middletown, Conn.

1,825,982. **Tire.** A. J. Reynolds, St. Paul, Minn.

1,826,063. **Umbrella Drop Cover.** H. Frenck, Nesekow, Post Arnshagen, Germany.

1,826,073. **Tire Patch.** P. E. Hawkinson, assignor to Kehawke Mfg. Co., both of Minneapolis, Minn.

1,826,221. **Ball.** H. C. Pearson, Pasadena, Calif.

1,826,234. **Toothbrush.** J. M. Acheson, Los Angeles, Calif.

1,826,246. **Fountain Pen Closure.** M. Heerklotz, assignor to Firm Simplo Fullfeder Gesellschaft Voss, Lausen & Dziambor, both of Hamburg, Germany.

1,826,400. **Cushion Shackle.** H. Ihrig, Lansing, assignor to General Motors Corp., Detroit, both in Mich.

1,826,432. **Carpet Sweeper Brush.** I. J. Owen, assignor to Bissell Carpet Sweeper Co., both of Grand Rapids, Mich.

1,826,587. **Eraser.** L. K. Wright, Jackson Heights, assignor of 22 per cent to N. Di Marco, 22 per cent to V. Camizzi, and 22 per cent to H. Viscardi, all of Corona, all in N. Y.

1,826,593. **Milk Can Cap.** J. Azamber, Pittsburg, Kan.

1,826,645. **Shoe Pac.** J. U. Bergquist, Hudson, assignor to A. A. Williams, Holliston, both in Mass.

1,826,943. **Teething Device.** J. A. Maker, Duluth, Minn.

1,827,224. **Footwear.** F. W. East, assignor to I. T. S. Rubber Co., Ltd., both of Petersfield, England.

1,827,241. **Tourniquet.** A. R. Kempf, Springfield, Tenn.

1,827,284. **Spring Shackle.** N. L. Dootson, San Francisco, assignor of 1/5 to C. W. Bassett and W. B. Juett, both of Antioch, all in Calif.

1,827,322. **Glass Breakage-proof Packing.** W. Lindermann, Hamburg, Germany.

1,827,435. **Automobile Fender.** M. Nastri, Akron, O.

1,827,476. **Doll.** M. A. Kolar, Portland, Ore.

1,827,668. **Tire.** A. J. Musselman, assignor to Goodyear Tire & Rubber Co, both of Akron, O.

1,827,942. **Extensible Band.** V. Guinzburg, assignor to I. B. Kleinert Rubber Co., both of New York, N. Y.

1,828,063. **Shock Absorber.** W. H. Mussey, assignor to Pullman Car & Mfg. Corp., both of Chicago, Ill.

1,828,109. **Tennis Racket.** W. H. Fox, Minneapolis, Minn.

1,828,136. **Pulley.** A. L. Freedlander, Dayton, O.

1,828,333. **Tire Boot.** C. P. McCormick, Chicago, Ill.

1,828,393. **Storage Battery.** R. H. Chilton, assignor to Inland Mfg. Co., both of Dayton, O.

1,828,402. **Connecter.** H. D. Geyer, assignor to Inland Mfg. Co., both of Dayton, O.

1,828,431. **Door Silencer.** O. F. Nelson, Chicago, Ill.

1,828,539. **Vibration Dampener.** H. C. Lord, Erie, Pa.

1,828,693. **Ice Freezing Tray.** H. R. Van Deventer, New York, N. Y., assignor, by mesne assignments, to Inland Mfg. Co., Dayton, O.

Dominion of Canada

315,603. **Barber Shop Hair Cloth.** P. Junas, Jr., Lansford, Pa., U. S. A.

315,664. **Sharp Freezing Unit.** Copeman Laboratories Co., assignee of L. G. Copeman, both of Flint, Mich., U. S. A.

315,665, 315,666 and 315,667. **Nonmetallic Connection.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of C. Saurer, Cleveland, O., U. S. A.

315,680. **Endless V-Belt.** Gates Rubber Co., assignee of C. C. Gates, both of Denver, Colo., U. S. A.

315,755. **Shock Absorber.** Luke Turner & Co., Ltd., assignee of G. L. Brooke-Hunt and L. Rowland, co-inventors, all of Leicester, England.

316,013. **Finger Eraser.** W. Paris, Hammond, La., and T. P. Hill, Colorado Springs, Colo., co-inventors, both in the U. S. A.

316,038. **Shoe.** J. F. Gilkerson, Milwaukee, Wis., U. S. A.

316,051. **Tire.** E. B. Killen, London, E.C. 4, England.

316,056. **Stocking Protector.** M. E. Longbottom, Toronto, Ont.

316,069. **Feeding Bottle.** E. Pitavy, Paris, France.

316,071. **Brush.** M. Samuel, Rostock, Mecklenburg, Germany.

316,166. **Shoe Stiffener.** United Shoe Machinery Co. of Canada, Ltd., Montreal, P. Q., assignee of R. H. Silvester and W. H. Bancroft, co-inventors, both of Leicester, England.

316,205. **Mat.** A. H. Alexander, co-inventor with and assignee of R. H. Oliver, both of Victoria, B. C.

316,215. **Tire.** F. F. Andersen, Oslo, Norway.

316,259. **Sole.** R. H. P. Oliver, Victoria, B. C.

316,261. **Inner Tube.** A. W. Ott, Dubuque, Iowa, U. S. A.

316,358. **Separable Fastener.** Lightning Fastener Co. (Ltd.), St. Catharines, Ont., assignee of G. Sundback, Meadville, Pa., U. S. A.

United Kingdom

352,198. **Tubing.** L. Rado, Berlin, Germany.

352,200. **Tennis Ball.** A. G. Spalding & Bros. (British), Ltd., London. (M. B. Reach and J. B. Dickson, both of Springfield, Mass., and J. R. Gammeter, Akron, O., all in the U. S. A.)

353,088. **Siphon Head.** L. Micsinay, Budapest, Hungary.

353,315. **Cable and Wire Coupling.**

Siemens-Schuckertwerke A. G., Berlin, Germany.

353,437. **Cable Joint.** Electrical Research Products, Inc., New York, N. Y., assignee of F. S. Malm, Chicago Ill., both in the U. S. A.

353,584. **Paper Folder.** W. W. Triggs, London. (Wood Newspaper Machinery Corp., New York, N. Y., U. S. A.)

353,645. **Paving.** F. J. Kellow, Weston-super-Mare.

353,933. **Lamp Holder.** British Thomson-Houston Co., Ltd., London, assignee of N. H. Watts, Alameda, Calif., U. S. A.

353,983. **Antislipping Carpet.** K. H. Hackländer, Rhineland, Germany.

354,035. **Waterproofs.** L. and M. Bloom, both of Salford, Lancashire, and A. W. Hodge, Kingston-on-Thames.

354,131. **Waterproofs.** N. Blond, Manchester.

354,206. **Waterproofs.** D. F. Atherton, Portsmouth.

354,243. **Top Boot.** W. W. Triggs, London (Mishawaka Rubber & Woolen Mfg. Co., Mishawaka, Ind., U. S. A.)

354,360. **Motor Horn.** A. G. Barrett and H. H. Burton, both of Leicester.

Germany

535,389. **Closure for Druggists' Sundries.** L. Hescher, Frankfurt a. M.-Wiesenau.

535,509. **Pneumatic Wheel.** F. F. Andersen Trading, Oslo, Norway. Represented by M. Abrahamsohn, Berlin-Tempelhof.

535,698. **Endless Belt.** Dunlop Rubber Co., Ltd., London, England. Represented by B. Kaiser and E. Salzer, both of Frankfurt a. M.

536,036. **Floating, Inflatable Article.** Radium-Gummiwerke m. b. H., Koln-Dellbruck.

536,685. **Hose.** C. Vollrath & Sohn Komm. Ges., Bad Blankenburg, Thuringer Wald.

Designs

1,186,726. **Heel.** Gummiwerke Ullrich G.m.b.H., Gelnhausen.

1,186,734. **Parts for Suspenders.** A. Behmel, Bodenbach a.d.E. Czechoslovakia. Represented by H. Zachel, Berlin-Wannsee.

1,186,877. **Heel.** G. Konig, Dresden-A.

1,187,032. **Nipple.** Deutsch-Oesterreichische Gummi-Manufakturen Kohlhaus Sohne, Harburg-Wilhelmsburg 1.

1,187,403. **Rubber-lined Tie.** R. Fruhling, Berlin N. 54.

1,187,481, 1,187,482, and 1,187,483. **Protected Metal Pipe.** New York Hamburger Gummi-Waaren Co., Hamburg 33.

1,187,794. **Rubber-lined Basin.** Allgemeine Elektricitäts-Gesellschaft, Berlin N.W. 40.

1,187,887. **Tire Cover.** Harburger Gummiwaren-Fabrik, Phoenix A. G., Harburg-Wilhelmsburg.

1,187,936. **Pessary.** R. Klotz, Munich.

1,188,129. **Loop for Suspenders.** P. Hirschhausen, Jarvenpaa, Finland. Represented by W. Esch, Hamburg 21.

1,188,134. **Collapsible Stand and Bathtub.** G. Reimer and H. Hansen, both of Husum.

1,188,345. **Belt.** M. Steinberg, Koln-Braunsfeld.

1,188,460. **Rubber-lined Bathtub.** Allgemeine Elektricitäts-Gesellschaft, Berlin N.W. 40.

1,188,704. **Belt.** Vorwerk & Sohn, Wuppertal-Barmen.

1,188,734. **Nipple.** G. Schonemeier, Barsinghausen bei Hannover.

1,188,739. **Tire.** Continental Gummi-Werke A. G., Hannover.

1,188,851. **Sponge Rubber Brush.** J. Samuel, Gummiwarenfabrik, Gustrow.

1,189,055. **Closure for Air Bags.** Mannheimer Gummistoff-Fabrik Rode & Schwalenberg G.m.b.H., Mannheim.

1,189,089. **Stocking.** K. Mederacke, Leipzig N. 21.

1,189,229. **Heating Cushion.** Mannheimer Gummistoff-Fabrik Rode & Schwalenberg G.m.b.H., Mannheim.

1,189,340. **Sanitary Binder.** K. Heiss, Nurnberg.

1,189,372. **Covered Metal Plates.** New York Hamburger Gummi-Waaren Co., Hamburg 33.

1,189,767. **Mat.** F. Kruger, Saarbrucken.

1,189,976. **Water Bottle Decoration.** Continental Gummi-Werke A. G., Hannover.

1,190,238. **Billiard Balls.** Continental Gummi-Werke A. G., Hannover.

1,190,642. **Hose.** Harburger Gummiwaren-Fabrik Phoenix A. G., Harburg-Wilhelmsburg.

Trade Marks

United States

287,509. Representations of a golf ball and a golf club and the word: **"Boye."** Golf clubs and balls. J. H. Boye Mfg. Co., Chicago, Ill.

287,535. Pentagon with the letters: **"S & G"** above it and the words: **"Foot Grace Arch Shoe"** within. Footwear. Strawbridge & Clothier, Philadelphia, Pa.

287,539. Label containing the words: **"The Faithful Four."** Footwear. Winchell Shoe Mfg. Co., Natick, Mass.

287,568. A band running through the word: **"Security."** Prophylactic articles. Dean Rubber Mfg. Co., N. Kansas City, Mo.

287,569. A section of a circle containing the words: **"The Safe-Way."** Prophylactic articles. Dean Rubber Mfg. Co., N. Kansas City, Mo.

287,574. The words: **"Double, Liquid Latex. Age Resisting"** within a fanciful design. Prophylactic articles. Rossen-Nessor Co., Akron, O.

287,616. Representation of a foot within a circle and the words: **"Every Woman's Foot Looks Good and Feels Good in Heel Fitter,"** the last two words being below the circle. Footwear. Guarantee Shoe Co., San Antonio, Tex.

287,625. Word: **"Vitalife"** above a triangle containing the words: **"it's insulated!"** Elastic webbing. Everlastik, Inc., Chelsea, Mass.

287,640. **Comfort.** Foot pads, bandages, etc. Forest City Rubber Co., Cleveland, O.

287,695. **Fero-Grip.** Friction materials. Jarvis & Jarvis, Inc., Palmer, Mass.

287,696. Double diamond containing the words: **"Gas and Oil Proof Laminated Gasket, Taulic."** Laminated gaskets. Victaulic Co. of America, Jersey City, N. J.

287,752. **Permaflex.** Tires. Jarvis & Jarvis, Inc., Palmer, Mass.

287,823. **Wolvo.** Valve ball. Wolverine Brass Works, Grand Rapids, Mich.

287,993. **Bob White.** Golf balls. J. C. Harlacker, Providence, R. I.

287,994. Representation of a golf ball showing a square within. Golf balls. St. Mungo Mfg. Co. of America, Newark, N. J.

287,998. **Speedee.** Golf clubs and balls. Royal Mfg. Co., Toledo, O.

288,011. **Empire.** Golf clubs, balls, and bags. J. Schoenberg, New York, N. Y.

288,121. Representation of a Zeppelin containing the word: **"Zeppelin."** Tires, tubes, and accessories thereof. Goodyear Tire & Rubber Co., Akron, O.

288,169. **Shaler.** Tire and tube patches. Shaler Co., Waupun, Wis.

288,179. **Red Man.** Belting, packing, and hose. United States Rubber Co., New York, N. Y.

288,194. Square containing a representation of, and the word: **"Arrow,"** and an octagon. Prophylactic articles. Regelson and Rostow, New Haven, Conn.

288,258. Representation of a section of belting. Belting. Boston Woven Hose & Rubber Co., Cambridge, Mass.

Dominion of Canada

53,023. **Bardex.** Dispersing agent. Barrett Co., New York, N. Y., U. S. A.

53,064. **Caliph.** Druggists' sundries. Canadian General Rubber Co., Ltd., Galt, Ont.

53,157. **Service.** Belting, packing, brake linings, etc. Canadian Johns-Manville Co., Ltd., Montreal, P. Q.

53,166. Circle containing letter: **"S."** Hard rubber products. Jos. Stokes Rubber Co., Trenton, N. J., U. S. A.

53,167. Circle containing letter: **"S"** and word: **"Stoco."** Battery containers. Jos. Stokes Rubber Co., Trenton, N. J., U. S. A.

53,168. Circle containing letter: **"S."** Hard rubber products. Jos. Stokes Rubber Co., Trenton, N. J., U. S. A.

53,171. **Lastex.** Yarns. Dominion Rubber Co., Ltd., Montreal, P. Q.

53,189. **Hi-Style Fash-En-Fit Exclusively Woodwards Footwear.** Footwear. Woodward Stores, Ltd., Vancouver, B. C.

53,202. **Knabob.** Prophylactic articles. Lymans, Ltd., Montreal, P. Q.

United Kingdom

522,242. **Altax.** Accelerators. Goodyear Tire & Rubber Co., Akron, O., U. S. A.

522,823. Portrait of the late J. P. Dunlop within an oval and upon a representation of a section of track, and the words: **"Trak Grip."** All goods in Class 40. Dunlop Rubber Co., Ltd., Ft. Dunlop, Birmingham.

524,827. **Gumotex.** Games and sporting articles not included in other than Class 49. Magyar Ruggyantaárugyár Részvénytársaság, Budapest X, Hungary.

525,010. **Bankide.** Soles and heels. Bank Bridge Works, Ltd., London, E. C. 3.

Market Reviews

Crude Rubber

New York Exchange

RUBBER production seems to be on as continuous a basis as some of our neighbors' radios. Or it might be likened to a machine that someone has started but doesn't know how to stop. It may smash itself against a stone wall some day, but at present a clear road seems to be ahead.

Malayan production in October was almost 46,000 tons, and for November the estimate is 50,000 tons. Stocks in the United States and in Great Britain have increased; while consumption is at a minimum. The problem of the rubber market is plainly seen in the United States figures for October, which showed consumption of 22,277 tons and arrivals of 41,395 tons.

Among the causes for this seemingly never-ending overproduction are the hope of restriction which would raise prices, the temporarily lowered freight rates, and the low price of rubber.

Although growers rushed all their available supplies of rubber to market under the low freight rates, the stocks of dealers have shown no decrease. Low prices are said to increase production because more rubber must be produced to get the same amount of money as would be secured with higher prices, and increased production makes for lower prices; so there seems to be a vicious circle on this point.

The largest consumer of rubber, the automobile industry, has been in the doldrums for practically the whole year. Production at present is only a fraction of what it was a year ago. Yet automobile manufacturers are optimistic. They are promising new models that will open the purse strings of a public that has allowed a back order of 5,000,000 motor cars to accumulate. Railroads report that sheet metal is moving in greater quantities to the motor industry.

What can be expected from the automobile industry will not be known until after the automobile shows in the next few months. But with dealers' stocks of automobiles and tires at low levels, a renewal of demand would lend a much more cheerful aspect to the market.

RUBBER BEAR POINTS

1. Malayan shipments for October were 45,911 tons, against 44,336 in September. Estimates put November shipments at 50,000 tons.
2. Ceylon shipments for October were 5,102 tons, against 4,195 in September and 4,577 in October, 1930.
3. Dealers' stocks at Singapore, Penang, etc., were 40,507 tons, against 39,368 tons during September and 34,479 a year ago.
4. Consumption in the United States for October was 22,277 tons, with arrivals of 41,395 tons.
5. Stocks on hand and afloat to the United States at the end of October were 341,883 tons, against 316,744 tons at the end of September.
6. United Kingdom stocks are about 15 per cent higher than a year ago.
7. Automobile production has been extremely low. Sales are far behind last year.
8. Tire shipments in September were 10.7 per cent lower than a year ago.
9. The Governor-General of the Dutch East Indies declared that restriction plans were impossible of accomplishment.
10. A large manufacturer announced that synthetic rubber could be produced commercially from coal, limestone, salt, and water.
11. Production on estates of over and under 100 acres for October in the Far East was 37,474 tons, against 26,823 tons in September, and 36,590 in October last year.
12. Dealers' stocks in the Far East were 17,988 tons at the end of October, against 15,350 tons last year.

RUBBER BULL POINTS

1. Automobile manufacturers are expected to go on a much more active production basis prior to introducing new models.
2. Tire casings in the hands of dealers on October 1 averaged 60.2 per dealer, against 62.4 a year ago. High pressure casings, inner tubes, and solid tires showed similar declines.
3. Standard Statistics states that it is "reliably informed that a downward revision in list prices (of automobiles) is definitely assured, at least by some makers, for next year."
4. Production of tires in September declined 5.7 per cent from September, 1930.
5. Stocks of tires on hand September 30 amounted to 8,158,453, a drop of 8.3 per cent from August 30, and 16.9 per cent from September, 1930.
6. Automobiles in the hands of dealers are the lowest in 3 years.
7. Research has indicated many new uses for rubber, including paving.

Week ended October 31. After the announcement that the Governor General of the Dutch East Indies was not in favor of restriction, the market turned unusually bearish with a decline of from 16 to 23 points, carrying the old October A contract to a new all-time low of 4.30 cents. We say unusually bearish because traders generally are not expecting the government to intervene, and the general opinion was that low prices would contribute more to restriction than artificial regulation.

Apparently the continuing high level of production made traders doubtful as to the efficacy of low prices and made them lean more heavily on the possibility that governmental taxes or restriction would take the initiative.

Another factor contributing to the lower prices—the low of 4.30 cents reached on Monday was superseded by a low of 4.20 cents on Wednesday—was the lower freight rate from the Far East. A reduction from $11.50 to $5.50 for a temporary period ending November 5 induced merchants in the Far East to rush rubber to market under the cheap freight rates.

As a result Malayan shipments for October are expected to exceed 45,000 tons. Shipments by the Dutch East Indies during September amounted to 21,667 tons, compared with 22,437 tons in August and 20,240 tons in September, 1930. These figures clearly show no let-up in production from a year ago.

The Rubber Division of the Department of Commerce also commented on the failure of low prices to lower crude rubber output in a bulletin issued October 27, in which it said in part: "The effect of low prices on production has not yet been nearly so marked as was generally anticipated. The huge increase in mature rubber which has been and is now coming to tapping age has been partly responsible; the hope of producers for government restriction has kept estates producing at an actual loss; the high expense of discharging and repatriating coolie labor and of later recruiting and training new personnel causes estates to postpone to the last moment shutdown of operations."

The bulletin also quotes a statement of the Governor of Straits Settlements and Federated Malay States, in which he said, "There is only one possible remedy for the rubber situation and that is an increase in the consumption of rubber in the world. It is on those lines that a solution can be sought and I fear, on no others."

The *Straits Times* said: "Will the restrictionists at last be persuaded to ac-

The Rubber Exchange of New York, Inc.

DAILY MARKET FUTURES—RIBBED SMOKED SHEETS—CLEARING HOUSE PRICES—CENTS PER POUND—NO. 1 STANDARD CONTRACTS

Positions	October, 1931					November, 1931																
1931	27	28	29	30	31	2	3*	4	5	6	7	9	10	11	12	13	14	16	17	18	19	20	21	23
Oct.	4.48	4.40	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Nov.	4.51	4.43	4.50	4.44	4.54	4.42	....	4.43	4.58	4.72	4.92	5.13	4.62	4.62	4.65	4.57	4.58	4.54	4.68	4.70	4.65	4.50	4.46	4.45
Dec.	4.54	4.46	4.54	4.48	4.58	4.45	....	4.46	4.61	4.75	4.95	5.18	4.65	4.65	4.68	4.59	4.60	4.56	4.70	4.70	4.67	4.52	4.48	4.45
1932																								
Jan.	4.60	4.52	4.60	4.55	4.64	4.50	....	4.52	4.65	4.81	5.01	5.24	4.70	4.71	4.77	4.66	4.67	4.63	4.77	4.78	4.73	4.57	4.53	4.51
Feb.	4.66	4.58	4.66	4.62	4.70	4.56	....	4.58	4.70	4.88	5.08	5.29	4.76	4.78	4.84	4.74	4.74	4.70	4.84	4.84	4.80	4.64	4.59	4.58
Mar.	4.72	4.65	4.72	4.68	4.77	4.62	....	4.64	4.70	4.95	5.15	5.35	4.82	4.85	4.90	4.82	4.82	4.78	4.91	4.91	4.89	4.71	4.65	4.65
Apr.	4.80	4.71	4.77	4.74	4.83	4.68	....	4.71	4.82	5.02	5.22	5.43	4.91	4.95	4.97	4.88	4.88	4.84	4.96	4.96	4.93	4.77	4.71	4.71
May	4.89	4.77	4.83	4.81	4.89	4.75	....	4.78	4.95	5.10	5.30	5.52	5.01	5.05	5.04	4.94	4.94	4.90	5.02	5.02	4.99	4.82	4.78	4.77
June	4.95	4.85	4.90	4.88	4.94	4.82	....	4.86	5.03	5.17	5.39	5.58	5.06	5.09	5.09	4.97	4.98	4.95	5.08	5.09	5.04	4.87	4.83	4.82
July	5.02	4.93	4.97	4.95	5.00	4.90	....	4.94	5.12	5.24	5.48	5.64	5.10	5.14	5.15	5.01	5.02	5.00	5.15	5.17	5.10	4.92	4.88	4.87
Aug.	5.09	4.99	5.04	5.02	5.07	4.97	....	5.00	5.18	5.32	5.53	5.67	5.16	5.18	5.19	5.08	5.09	5.07	5.21	5.22	5.16	4.97	4.93	4.94
Sept.	5.17	5.06	5.12	5.09	5.15	5.05	....	5.06	5.25	5.40	5.59	5.70	5.23	5.23	5.24	5.15	5.17	5.14	5.27	5.27	5.22	5.02	4.99	5.02
Oct.	....	....	....	....	....	5.15	....	5.16	5.35	5.50	5.69	5.80	5.33	5.33	5.34	5.25	5.27	5.24	5.37	5.37	5.30	5.09	5.08	5.08

* Holiday.

cept this as final? They have been told often enough and definitely enough, by spokesmen in Great Britain and in Malaya, that there is not the slightest hope of restriction being imposed by law."

In the light of these facts it is hard to see why the market responded so unfavorably to another statement that restriction would not be undertaken by the Governor of the Dutch East Indies.

Prices at the close of October 31 on No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
Nov.	....	....	4.54	4.44
Dec.	4.52	4.52	4.58/4.63	4.48
Jan.	....	....	4.64	4.55
Feb.	....	....	4.70	4.62
Mar.	4.79	4.75	4.77	4.68
Apr.	....	....	4.83	4.74
May	....	....	**4.89**	**4.81**
June	....	....	4.94	4.88
July	....	....	5.00/5.02	4.95/5.00
Aug.	....	....	5.07	5.02
Sept.	....	....	5.15/5.17	5.09
Spot	....	....	4.55	4.50

Week ended November 7. After shaking off the Election Day holiday spirit, the rubber market advanced from 20 to 40 points, having lost 10 to 15 points on Monday. The firmness was ascribed to restriction news.

A cable to the Exchange said that the Government Economic Committee in Batavia, Dutch East Indies, was meeting to reach a final proposal to be made to the government regarding the rubber restriction problem. After the meeting, however, no announcement was made, with the market interpreting the silence of the committee as favorable to restriction.

The market was also influenced by the encouraging display of strength in the wheat and the stock markets. Stocks of rubber at London and Liverpool, too, were expected to decrease, after declining 850 tons the previous week.

On the other side are large shipments of rubber received during the month. Malayan rubber received in the United States during October was 32,872 tons, against 29,476 tons in September and 24,999 tons during October, 1930. Total shipments from Malaya during October were 45,911 tons, against 44,336 tons in September and 42,832 tons in August. Ceylon's exports last month were 5,102 tons, against 4,195 tons in September. Of this amount 3,206 tons were shipped to America, against 3,033 tons in September. The cause for these large shipments was said to be the lowered freight rate between Singapore and New York.

Since the temporarily lowered rates were effective until about November 6, November shipments are expected to be larger than usual. Perhaps the freight rates have increased shipments to some extent, but they can not be held entirely responsible for the larger exports. In September and August, when the rates were still high, rubber was being shipped at a rate in excess of 40,000 tons. If the low prices and the closing of estates had had the desired effect, shipments in these months would have been far less. The trouble lies in the fact that large areas are becoming productive, existing estates are being tapped for all they are worth, and many estate owners that might have closed are holding out hoping that government aid toward restriction will boost prices.

Now comes an announcement that synthetic rubber with many qualities which natural rubber does not have can be manufactured commercially and that a plant for its production is in course of construction.

Prices at the close of November 7 on No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
Nov.	....	....	4.92	4.72
Dec.	4.95	4.95	4.95/4.99	4.75/4.80
Jan.	....	....	5.01	4.81
Feb.	....	....	5.08	4.88
Mar.	5.18	5.05	5.15	4.95
Apr.	....	....	5.22	5.02
May	5.30	5.22	5.30/5.33	5.10/5.11
June	....	....	5.39	5.17
July	5.48	5.35	5.48	5.24/5.26
Aug.	....	....	5.53	5.32
Sept.	5.59	5.55	5.59	5.40/5.43
Oct.	....	....	5.69	5.50
Spot	....	....	....	....

Week ended November 14. After starting the week with a turnover of 2,835 tons, the largest single day's business this year, the market relapsed because of the strenuous pace and resumed its former gait.

The speculative transactions on Monday were a result of the anxiety over the Manchuria situation, and in sympathy with the other commodity markets which advanced sharply. When the commodity markets reacted, the rubber market followed suit.

The reversal in trend was also due in part to a restriction report from the Far East. A cable to the Exchange read that the Dutch Governor stated that rubber restriction plans must be considered almost impossible from the point of view of their impracticability. In the Governor's view the scheme would be costly, with the improbability that even 50 per cent restriction would sufficiently raise prices to enable producing concerns with high working costs to make a profit.

RUBBER EXCHANGE ACTIVITIES

Week Ended	Transactions: Contracts Sold Number	Contracts Sold Tons	Transferable Notices	Week-End Tone
Oct. 31 ...	444	1,110.0	10	Quiet
Nov. 7 ..	511	1,277.5	2	Firm
Nov. 14 ...	826	2,065.0	6	Quiet & steady
Nov. 21 ...	665	1,662.5	4	Quiet
Totals ..	2,446	6,115.0	22*	

* Actual deliveries of rubber.

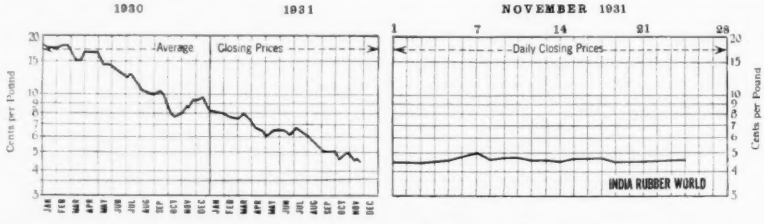
The decline on Tuesday was from 40 to 49 points, compared with the prices to which the market had climbed the day before. Besides the weakness in stocks and cotton and the views of the Dutch Governor on restriction, the decline was also caused by unfavorable statistics.

Dealers' stocks in Malaya at the end of October totaled 39,497 tons, dry basis, compared with 38,411 tons at the end of September, and 34,479 tons at the end of October, 1930. Harbor Board stocks at Singapore and Penang increased from 7,657 tons at the end of September to 11,625 tons last month, and 4,734 tons at the end of October, 1930.

The October statistical report received on Friday showed the expected increases in stocks, accumulated as a result of the lower freight rates which had an abnormal effect on shipments. Total domestic stocks on hand at the end of October were 273,456 long tons, an increase of 7.5 per cent over September, and 47.4 per cent over October last year.

Consumption during October was 22,277 tons, against 23,638 in September, and 27,516 tons in October last year. At the same time it was unofficially estimated that London and Liverpool stocks would decline 1,250 tons for the present week.

In the face of increased stocks of rubber the automobile industry cut production to extreme limits. For the week ended November 7, output was estimated in "Cram's Automotive Reports" to be 8,592 units, compared with 10,171 in the preceding week, and 31,650 units in the corresponding



New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets

New York Outside Market—Spot Closing Rubber Prices—Cents Per Pound

	October, 1931						November, 1931																	
	26	27	28	29	30	31	2	3*	4	5	6	7	9	10	11	12	13	14	16	17	18	19	20	21
Ribbed Smoked Sheet	4 5/8	4 7/8	4 3/8	4 1/4	4 3/8	4 3/8	4 7/16	...	4 1/2	4 3/8	4 11/16	4 7/8	5	4 5/8	4 11/16	4 11/16	4 5/8	4 5/8	4 7/16	4 3/4	4 11/16	4 11/16	4 1/2	4 1/2
No. 1 Thin Latex Crepe	5	5	4 7/8	4 7/8	4 11/16	4 11/16	4 11/16	...	4 7/8	4 11/16	5 5/16	5 1/4	5 3/16	4 11/16	5 1/16	5 1/16	5	5	4 7/8	5 1/16	5 1/16	5 1/16	4 7/8	4 11/16
No. 1 Thick Latex Crepe	4 7/8	4 11/16	4 3/4	4 3/4	4 7/8	4 7/8	4 11/16	...	4 3/4	4 11/16	5	5 1/16	5 1/16	4 7/8	5	5	5	5	4 11/16	5 1/16	5 1/16	5 1/16	4 7/8	4 11/16
No. 1 Brown Crepe ..	4 1/2	4 1/2	4 3/8	4 3/8	4 3/8	4 3/8	4 7/16	...	4 7/16	4 3/8	4 7/16	4 11/16	4 7/8	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 7/16	4 1/2	4 1/2	4 1/2	4 3/8	4 3/8
No. 2 Brown Crepe ..	4 3/8	4 3/8	4 1/4	4 1/4	4 1/4	4 1/4	4 1/4	...	4 1/4	4 1/4	4 3/8	4 5/8	4 3/4	4 3/8	4 3/8	4 3/8	4 3/8	4 3/8	4 7/16	4 3/8	4 3/8	4 3/8	4 7/16	4 1/4
No. 2 Amber	4 1/2	4 1/2	4 3/8	4 3/8	4 3/8	4 3/8	4 7/16	...	4 7/16	4 3/8	4 7/16	4 11/16	4 7/8	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 7/16	4 1/2	4 1/2	4 1/2	4 3/8	4 3/8
No. 3 Amber	4 3/8	4 3/8	4 1/4	4 1/4	4 1/4	4 1/4	4 1/4	...	4 1/4	4 1/4	4 1/4	4 5/8	4 3/4	4 3/8	4 3/8	4 3/8	4 3/8	4 3/8	4 7/16	4 3/8	4 3/8	4 3/8	4 7/16	4 1/4
No. 4 Amber	4 1/4	4 7/16	4 1/16	4 1/16	4 1/16	4 1/16	4 1/16	...	4 3/16	4 7/16	4 1/4	4 1/2	4 5/16	4 7/16	4 7/16	4 7/16	4 1/16	4 1/4	4 1/4	4 7/16	4 7/16	4 7/16	4 1/4	4 7/16
Rolled Brown	4	4	3 7/8	3 7/8	3 7/8	3 7/8	3 7/8	...	3 7/8	3 7/8	4	4 1/4	4 3/8	4 1/8	4 1/8	4 1/8	3 11/16	3 11/16	3 7/8	4	4 1/16	4 1/16	3 7/8	3 7/8

*Holiday.

week last year. The drop in automobile production has been greater than normal, and at present most of the plants are closed down prior to the introduction of new models. Indications are that when the new season gets under way, there will be a determined drive to sell automobiles to a public that has closed its purse for a long time. Even a slight increase in sales will be felt because stocks on hand are at a minimum.

Prices at the close of November 14 on No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
Nov.	....	....	4.58	4.57
Dec.	4.57	4.57	4.60	4.59/4.62
Jan.	....	....	4.67	4.66
Feb.	....	....	4.74	4.74
Mar.	4.79	4.79	4.82	4.82
Apr.	....	....	4.88	4.88
May	4.96	4.96	4.94	4.94
June	....	....	4.98	4.97
July	5.00	4.99	5.02	5.01/5.04
Aug.	....	....	5.09	5.08
Sept.	5.16	5.12	5.17/5.22	5.15/5.17
Oct.	....	....	5.27	5.25
Spot	....	....	4.60	4.59

Week ended November 21. Featured by 2 record transactions in rubber, the market nevertheless closed the week at about where it started, in spite of the gains encouraged by the 2 large sales mentioned. On Monday one of the largest single transactions in the history of The Rubber Exchange of New York, Inc., took place. A dealer bought 500 tons of crude rubber for March delivery from a trade broker at the price of 4.90 cents a pound, representing an advance of 12 points from the previous closing price. The rubber involved in this single transaction, 1,120,000 pounds, had a market value at the time of approximately $54,880. At the peak prices during 1925, such a quantity would have been valued at $1,400,000.

Otherwise news in the rubber market was rather meager. The stock and the wheat markets turned downward in the last week and had an adverse influence on rubber. The optimism that prevailed, while wheat prices were soaring so rapidly, has dwindled in the face of a reaction in wheat prices; this reaction has resulted in a more pessimistic view, apparently, in all the markets.

The rubber market at present is waiting for developments in the automobile industry. But car manufacturers are at present operating on an extremely limited schedule preparatory to release of new models. Dealers report slow sales except in cases where bargains are being offered on old models.

"Cram's Automotive Reports" put production at 9,156 units for the week ended November 14, against 8,592 units the week before, and 43,194 the corresponding week last year.

One report from Detroit seems to indicate that recovery is already on the way: factories are stepping up activity, and employment is increasing rapidly. The railroads are also reporting that sheet metal moved much faster in the last fortnight.

The change in sentiment, according to the *Herald Tribune*, "is particularly emphasized in the automotive and allied industries, bearing out in fact the theory that the motor industry has always been the first to recover after periods of depressed business. . . .

"Good business for at least 6 months to come is anticipated by the automotive industry, based on a realization that there is an existing replacement market for 5,000,000 motor cars. The 1932 offerings are expected to release a large portion of this pent-up buying power. Dealer stocks are the lowest in 3 years. . . By December 1 practically every automobile plant in Michigan will be on a production basis, and it may safely be said that their payrolls will increase 10 to 15 per cent."

Prices at the close of November 21 on No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
Nov.	....	....	4.46	4.50
Dec.	4.50	4.48	4.48	4.51/4.52
Jan.	....	....	4.53	4.57
Feb.	....	....	4.59	4.64
Mar.	4.67	4.67	4.65/4.70	4.71/4.73
Apr.	....	....	4.71	4.77
May	4.80	4.78	4.78/4.80	4.82/4.85
June	....	....	4.83	4.87
July	4.94	4.87	4.88/4.90	4.92/4.94
Aug.	....	....	4.93	4.97
Sept.	5.05	5.00	4.99/5.01	5.02/5.05
Oct.	5.15	5.10	5.08/5.10	5.09/5.15
Spot	....	....	4.49	4.53

The market on November 23 was very dull. Transactions totaled 66 contracts. No. 1 Standard contracts for November closed at 4.46 nominal. London was asking 4.75 cents for actuals on November 24, while the New York price was 4 5/8 cents, indicating unexplained optimism in the London market.

Price Differentials

Price differentials between the various grades of Hevea plantation rubber which shall prevail on all deliveries against old

New York Quotations

Following are New York outside market rubber quotations for one year ago, one month ago, and November 24, the current date

Plantation Hevea	November 24, 1930	October 26, 1931	November 24, 1931
Rubber latex (Hevea) *gal.*	$0.75 @	$0.69 @	$0.69 @
Sheet			
Ribbed, smoked, spot *lb.*	.09¼@.09⅜	.04 11/16@.04¾	.04 9/16@.04 5/16
November	.09¼@	.04 11/16@	.04 9/16@.04 5/16
November-December	.09⅜@.09½	.04¾@	.04 9/16@.04 5/8
January-March	.09½@.09¾	.04⅞@	.04¾@
April-June	.09¾@.10⅛	.05 @.05 1/16	.04⅞@
CREPE			
No. 1 Thin latex (first latex) spot	.09¾@.10	.05⅛@.05¾	.04 11/16@.05 1/16
November	.09⅞@	.05⅛@	.04 11/16@.05 1/16
November-December	.09⅞@.10	.05¼@	.04 11/16@.05 1/16
January-March	.10¼@.10⅜	.05 9/16@.05¾	.05 1/16@.05 9/16
April-June	.10½@.10¾	.05⅜@.05½	.05 5/16@.05⅜
No. 2 Amber, spot ("B" blanket)	.08⅞@.09	.04½@.04⅝	.04¾@
November	.08⅞@	.04½@	.04¾@
November-December	.08⅞@.09	.04⅝@	.04¾@
January-March	@	.04⅝@.04⅞	.04½@.04 9/16
April-June	@	.04¾@.05	.04⅝@.04 11/16
No. 3, Amber, spot ("C" blanket)	.08½@.08¾	.04⅜@.04½	.04¼@.04 5/16
No. 1 Brown, clean, light, thin	.08¾@	.04 11/16@	.04⅜@.04½
No. 2 Brown, clean, thin	.08⅛@.08¾	.04⅝@	.04¼@.04 3/16
Brown, roll	.08¼@.08½	.04 @.04⅛	.04 @.04⅛
East Indian			
PONTIANAK			
Bandiermasin	.06 @	.06 @	.06 @
Pressed block	.12 @	.09 @	.09 @
Sarawak	.06 @	.06 @	.06 @
South American			
PARAS			
Upriver, fine	.12¾@	.05¾@	.05¾@
Upriver, fine	*.15½@	*.09½@	*.09½@
Upriver, coarse	.08¼@	†.04½@	†.03½@
Upriver, coarse	*.10½@	*.05¼@	*.05 @

South American	November 24, 1930	October 26, 1931	November 24, 1931
PARAS—*Continued*			
Islands, fine *lb.*	$0.12 @	†$0.05 @	†$0.05 @
Islands, fine	*.15 @	*.09 @	*.09 @
Acre, Bolivian, fine	.13 @	.05⅞@	.06 @
Acre, Bolivian, fine	*.16 @	*.10 @	*.10 @
Beni, Bolivian	.13⅛@	.06 @	.06 @
Madeira, fine	.12¾@	.05¾@	.05¼@
CAUCHO			
Upper caucho ball	.07¾@	†.04 @	†.03 @
Upper caucho ball	*.10½@	*.05¼@	*.05 @
Lower caucho ball	.07 @	†.03 @	†.02½@
Manicobas			
Ceará, negro heads	@	@	@
Ceará scrap	@	@	@
Manicoba, 30% guaranteed	@	†.04 @	†.05 @
Mangabiera, thin sheet	@	†.04 @	†.05 @
Guayule			
Duro, washed and dried	.15 @	.13 @	.13 @
Ampar	.16 @	.14 @	.14 @
Gutta Percha			
Gutta Siak	.13½@	.10½@	.10 @
Gutta Soh	.29 @	.18 @	.18 @
Red Macassar	@	2.00 @	2.00 @
Balata			
Block, Ciudad Bolivar	.32 @	.23 @	.20 @
Colombia	.32 @	@	@
Manaos block	.37 @	.23 @	.20 @
Surinam sheet	.57 @	.45 @	.45 @
Amber	.60 @	.50 @	.48 @

* Washed and dried crepe. Shipment from Brazil.
† Nominal.

"A" contracts for December, 1931, follow: Off quality first latex crepe at one-tenth of a cent (.1c.) per pound; good f. a. q. ribbed smoked sheets at two-tenths of a cent (.2c.) per pound; ordinary f. a. q. ribbed smoked sheets at thirty-five one-hundredths of a cent (.35c.) per pound.

N. Y. Outside Market

It is a buyer's market, and representatives of manufacturers are doing nothing to change that condition. They are buying rubber, of course, but only as necessary. They seem to lower their bids with each drop in price, always remaining a little under the market. The theory on which they are operating is that the statistical position of the market is such that prices will remain low for some time to come; so there is no rush to buy.

Statistics, of course, bear them out in this assumption. Production is high, and consumption low. Sales of automobiles have been behind those of last year for at least 6 months in a row.

Low consumption is due to the fact that tire production as well as automobile production is behind that of last year. The expected replacement demand for tires, like the expected curtailment of output on the rubber estates, has not appeared.

In one way this condition has been an advantage because dealers have reduced their stocks of tires and cars to the fewest possible. In the next few weeks manufacturers will be supplying dealers with new spring models. Since it is quite generally believed that the public will buy no cars until the new models are displayed, the automobile shows are being awaited with keen interest.

To add to its many problems the rubber market is now confronted with the possibility that synthetic rubber may be produced commercially. A large manufacturer announced the building of a factory for the output of rubber made from coal, water, salt, and limestone. Besides Edison's experiments with golden rod are well known and are said to have been successful.

But to offset this possibility is the continued research to discover new uses for rubber. Experiments with rubber paving are said to have been successful although more expensive than ordinary paving. The wearing qualities, however, are much more lasting.

Until these experiments become practical, the rubber market must depend on ordinary industrial activity for recovery.

Week ended October 31. As far as buying was concerned, the market was almost at a standstill. Prices receded from the higher levels reached in previous weeks, but under no stronger influence than another denial of a report that governmental aid was being enlisted in a restriction plan.

Imports of crude rubber for October and November are expected to be heavy. The reason is that Far Eastern dealers are shipping all available rubber to take advantage of the temporarily lowered freight rates. The rate was put at $5.50 instead of $11.50 for a short period ending November 5.

Consumption, meanwhile, is at a low level. The manufacturers' report compiled by the Bureau of the Census and released October 28, showed that September sales of automobiles declined for the fifth consecutive month, and that for the first 9 months of 1931, sales dropped almost 800,000 units behind those in 1930.

September automobile sales of 140,566 vehicles compares with 187,197 for August, 220,649 for September, 1930, and 415,912 for September, 1929. Passenger car sales showed the biggest drop, about 700,000 less than those of a year ago; while truck sales were about 110,000 units less.

Prices at the close of October 31 were:

Spot	Oct. 31	Month Ago	Year Ago
Crepe	4 1/8	4 7/8	9 1/8
Ribs	4 7/8	4 7/8	8 3/4
Upriver fine	6	6	12 1/4

Week ended November 7. Only 10,171 automobiles were produced in the week ended October 31, according to "Cram's Automotive Reports," against 17,301 units (revised) for the previous week, and 31,827 in the same week a year ago. The reason is that manufacturers in many cases are closing their plants prior to starting production on new models. A great many new models with unusual designs are expected this year. Great interest is centered around what Ford will do. Rumors of new models, of a car in a new price field, of one with more cylinders, and of a 12-cylinder Lincoln are heard.

Until this new production gets under way buyers are not expected to be active in the rubber market. Tire stocks are said to be at a low level, and an upturn in the automobile industry will mean a hurried effort to replenish stocks.

The Malayan figures were heavy, as expected because of the low freight rates. For October, shipments were 45,911 tons, against 44,336 in September. London and Liverpool stocks are declining lately, and during October Malayan shipments to the United Kingdom were only 4,529 tons, against 5,204 in September.

The rise in wheat and cotton are considered encouraging factors. The purchasing power of the wheat farmer has increased by about half a billion dollars. The National Credit Pool is also helping to release frozen assets; and if this buying power can be freed, it may be the spark to ignite a real glow of confidence.

Another encouraging sign is that the hoarding of gold in our own country had been halted. In one week about $24,000,000 was returned to the banks after several weeks of steady withdrawals.

Against the unfavorable statistical position, then, are the favorable factors of low stocks on hand and the unexpected rise in wheat prices with its effect on the purchasing power of wheat farmers.

Prices at the close of November 7 were:

Spot	Nov. 7	Month Ago	Year Ago
Crepe	5 1/4	5 7/8	8 5/8
Ribs	4 7/8	4 1/8	8 1/4
Upriver fine	6 1/4	6	12 1/4

Week ended November 14. Although the attempt to disregard the statistics in the rubber industry is frequently made, it has not yet been successful. It was demonstrated again this week.

The market in rubber forged ahead on Monday along with the other commodity markets, but the next day, when it was again made plain that there was no hope for government aid in restriction, and when it was shown that the large stocks on hand had become larger, the market settled back again into the groove in which it had been traveling for the past few weeks.

According to *The New York Times*, "Curtailment in the motor-car industry has now proceeded to a point where there has undoubtedly been built up a huge deficit in dealers' stocks of cars so that recovery in output, when it once gets under way, is likely to be rapid. New passenger-car sales continued to decline more than seasonally in September, the latest month for which complete registration figures are available, and exports, seasonally adjusted, were the smallest since May, 1922; but September factory output was some 32 per cent below combined domestic and foreign sales, and the further drastic curtailment which has occurred since then has unquestionably increased the deficit by a substantial amount."

Figures from the tire industry tell the same story. Shipments of rubber tires in September amounted to 3,931,860, a decrease of 20.7 per cent from August, and a drop of 10.7 per cent from September, 1930, according to the Rubber Manufacturers' Association. Production of tires in September decreased 18.8 per cent from August, and 5.7 per cent from September, 1930. Stocks of tires on September 30 were 8.3 per cent less than on August 30 and 16.9 per cent less than on September 30, 1930.

Prices at the close of November 14 were:

Spot	Nov. 14	Month Ago	Year Ago
Crepe	5	5 1/4	9 3/8
Ribs	4 5/8	5	9 1/8
Upriver fine	6	6	12 1/4

Week ended November 21. Buying is still limited. Every time the market drops, buyers seem to lower their bids. Future purchases are not being made to any great extent because of the low prices and the prospect that they will be low for some time to come.

From all reports the automobile industry shows dealers have the lowest stocks of cars on hand in 3 years.

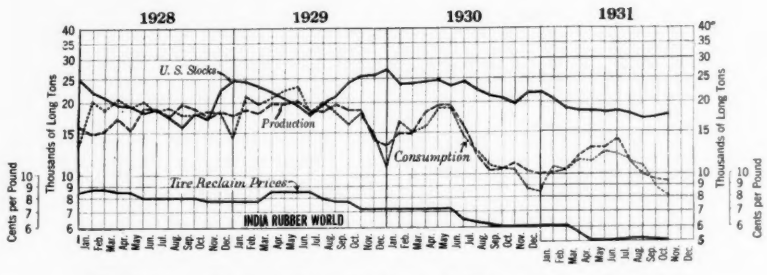
Automobile manufacturers are busy preparing 1932 models for the spring trade. Following the automobile shows in the next few months it is expected that people will spend some of the money that seems to have been withdrawn from circulation. Manufacturers are said to be making an unusual effort to introduce new designs that will appeal to the taste of the public.

Prices at the close of November 21 were:

Spot	Nov. 21	Month Ago	Year Ago
Crepe	4 1/8	5 1/2	9 5/8
Ribs	4 1/2	5 1/8	9 1/4
Upriver fine	5 3/4	6	12 1/2

Actuals in the outside market were offered at 4 5/8 cents on November 23 and 24. Buying interest was entirely absent. American rubber manufacturers are well stocked for current needs and apparently are well protected against any notable increase of prices by their rubber commitments.

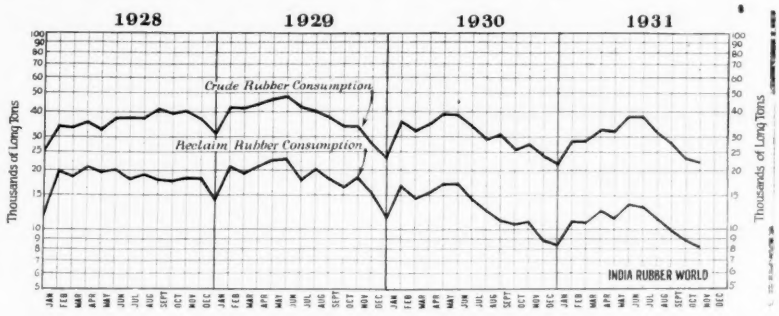
Reclaimed Rubber



Production, Consumption, Stocks, and Price of Tire Reclaim

THE statistical record of reclaim for October shows that production for that month was 9,482 long tons compared with 9,629 tons for September. Reclaim consumption in October was 8,126 tons compared with 8,932 tons in September. to 17,741 tons or 515 tons more than for September.

Persistence of the extremely low price level of crude rubber together with the falling off in its consumption in October combined to drop the ratio of reclaim to



Crude and Reclaimed Rubber Consumption

Comparison of consumption figures of crude and reclaim rubber shows that in October the ratio of reclaim to crude consumed was 36.4 per cent or 1.4 per cent less than in September. Stocks on hand in the United States October 31 amounted crude. The present ratio, however, is .8 per cent above the average consumption ratio for the 6 months April to September inclusive. The maintenance of the ratio at around 35 per cent is cited by reclaimers as evidence of the intrinsic technical value of reclaim independent of price considerations as compared with crude.

A similar condition prevails with respect to factice, which long ago ceased to be regarded as a cheap substitute for rubber and became esteemed for its intrinsic value in certain classes of rubber work.

One instance has recently come to notice where unique quality enables one reclaimer to sell a special reclaim at more than twice the current price of either crude or standard tire reclaim.

Quotations of standard reclaims are reported below. In every instance except one the prices are fractionally lower than one month ago. The exception referred to is No. 1 tube reclaim, which is quoted unchanged.

New York Quotations

November 24, 1931

	Spec. Grav.	Price Per Pound
High Tensile		
Super-reclaim, black	1.20	$0.05¾@$0.06
red	1.20	.05½@ .05¾
Auto Tire		
Black	1.21	.04½@ .04¾
Black selected tires	1.18	.04¾@ .05
Dark gray	1.35	.05¼@ .05½
White	1.40	.06 @ .06¼
Shoe		
Unwashed	1.60	.05¼@ .05½
Washed	1.50	.06¼@ .06½
Tube		
No. 1	1.00	.07 @ ...
No. 2	1.10	.05 @ .05¼
Truck Tire		
Truck tire, heavy gravity	1.55	.05¼@ .05½
Truck tire, light gravity	1.40	.05½@ .05¾
Miscellaneous		
Mechanical blends	1.60	.03½@ .04

Standard Reclaims

In the present situation where economy of cost favors crude rather than reclaim a sharp curtailment in reclaim consumption is a natural consequence. Complete elimination of reclaim, however, is not to be expected, for workability and service are the final proofs of the technical value of reclaims. Conservative companies have well established compounds developed for definite working qualities and costs. They are maintaining these technical conditions unchanged as may be expedient in order to avoid the peaks and valleys of production cost and change in quality. They recognize that radical changes in compounding practice involve time and expense for development and standardization which when done should be conserved rather than abandoned for an interval of problematic gain.

In this connection price stabilization of reclaim is a factor of great importance, also the very close and continuous uniformity in chemical and physical characteristics maintained by every reclaimer in his products as regards quality, gravity, color, plasticity, curing quality, and protection against oxidation.

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption Per Cent to Crude	United States Stocks*	Exports
1925	132,930	137,105	35.6	13,203	4,571
1926	180,582	164,500	45.9	23,218	5,391
1927	189,144	178,471	47.6	24,980	8,540
1928	208,516	223,000	50.4	24,785	9,577
1929	219,057	224,253	47.9	27,464	12,721
1930	157,967	153,497	41.5	24,008	9,468
1930					
January	13,902	15,766	45.8	24,241	954
February	14,676	14,012	45.5	24,241	1,203
March	16,115	14,669	43.2	24,415	1,048
April	16,511	16,269	43.0	24,592	740
May	16,496	16,411	43.7	23,356	939
June	14,581	13,534	41.6	24,484	641
July	11,411	11,918	42.3	22,477	778
August	11,158	11,321	35.9	21,636	807
September	10,588	10,787	41.4	20,704	656
October	11,437	11,038	39.3	19,912	572
November	10,895	9,075	37.5	22,000	437
December	10,197	8,697	39.3	22,000	693
1931					
January	10,460	11,003	37.6	20,466	649
February	10,871	10,800	37.5	18,878	625
March	12,938	12,524	38.2	18,375	752
April	13,267	11,745	35.2	18,356	577
May	13,478	13,103	34.6	18,088	798
June	14,066	13,045	34.4	18,505	703
July	11,393	11,447	35.8	17,720	414
August	10,110	9,972	36.1	17,165	410
September	9,629	8,932	37.8	17,226	516
October	9,482	8,126	36.4	17,741	...

*Stocks on hand the last of the month or year.
Compiled by The Rubber Manufacturers Association, Inc.

"Wherefore Art Thou" Micronex?...

Does Micronex look different?..... **No!**
Does Micronex feel different?..... **No!**
Does Micronex analyse differently? .. **No!**

Why the difference between Micronex and ordinary carbon black?...

The difference is subtle, hidden... but **VITAL**

MICRONEX

reinforces rubber more completely
reinforces rubber more uniformly

That is why
Micronex made the tire of today
and why
More tires are made with Micronex than with any other brand.

BINNEY & SMITH CO.

41 East 42nd Street **New York, N. Y.**

Compounding Ingredients

MANUFACTURING activity in all divisions of the rubber industry is proceeding steadily in generally fair volume. The decline in output is probably most marked in the tire division, where production is estimated at about 40 per cent of capacity. Increase in tire demand for new equipment awaits the reaction of the motoring public to the annual display of cars, the first of which takes place in New York early in January.

The movement of compounding ingredients in general is moderate only because the seasonal slackness is emphasized by the current industrial status.

ACCELERATORS. The well-known technical value of accelerators is responsible for the good demand that persists for them. It is important to observe that the demand is best for the most effective accelerators, which, naturally, also command the highest prices.

AGE RESISTERS. These materials like accelerators rate in commercial demand strictly on the basis of their technical quality quite independently of cost. Those who purchase rubber goods by specification are emphasizing resistance to aging as a very important requirement. This tendency is noticeable even in the case of otherwise low grade goods where maximum durability is sought together with low cost.

CARBON BLACK. The contract demand for carbon black for 1932 consumption shows improvement. The current consumption is maintained by hand-to-mouth placement of orders. Prices remain unchanged at 3 cents f.o.b. Tex. and 3.1 cents f.o.b. La.

LITHARGE. Early in November the price advanced ½-cent a pound to 6½ cents, with price protection to December 31 on 100-lb. packages.

LITHOPONE. Consuming demand is fair with withdrawals against contracts slow. Prices for the first half of 1932 are quoted at .04½ to .05 cents.

SOFTENERS AND STABILIZERS. The practical necessity of this group of ingredients in rubber mixings for all purposes creates a steady, although now somewhat reduced, demand. Stearic acid is firm in price. Degras is steady and demand conservative.

SOLVENTS. Heavy and light grades of solvents advanced about the middle of the month ½-cent per gallon to 6½-cent basis.

ZINC OXIDE. Users are carrying small inventories. The consuming demand is fair and steady. Price is unchanged, and improved business is expected in 1932.

New York Quotations

November 24, 1931

Prices Not Reported Will Be Supplied on Application

Abrasives			
Marble flour	ton	$15.00	@
Pumice	lb.	.03	@
Rottenstone, domestic	ton	23.50	@ 28.00
Rottenstone, English	lb.	.03¼	@
Silica, spot, l. c. l.	lb.	.01	@ .01¼
Accelerators, Inorganic			
Lead, carbonate	lb.	.07¼	@
red	lb.	.07½	@
sublimed blue	lb.	.06¾	@
sublimed white	lb.	.06¾	@
super-sublimed white	lb.	.06¾	@
Lime flour, hydrated	ton	40.00	@
Litharge, casks	lb.	.06½	@
Magnesia, calcined, heavy	lb.	.04	@
carbonate	lb.	.06	@ .07
Orange mineral A.A.A.	lb.	.09½	@
Accelerators, Organic			
Aldehyde ammonia	lb.	.65	@ .67
Altax	lb.		@
Barak	lb.		@
BLE	lb.		@
Butene	lb.		@
Captax	lb.		@
Crylene	lb.		@
paste	lb.		@
DBA	lb.		@
Di-esterex N.	lb.		@
DOTG	lb.	.42	@ .43
DPG	lb.	.30	@ .31
Ethylidine aniline	lb.	.45	@ .46
Formaldehyde aniline anhydro	lb.	.37½	@ .38½
Grasselerator 808	lb.		@
833	lb.		@
Heptene	lb.		@
base	lb.		@
Hexamethylenetetramine	lb.	.58½	@ .59½
Hydrone	lb.		@
Lead oleate, No. 999	lb.	.125	@
Witco	lb.	.10	@
Lithex	lb.		@
Methylene dianiline	lb.	.37½	@ .38½
Monex	lb.		@
Novex	lb.		@
Phenex	lb.	.65	@ .70
Plastone	lb.		@
R & H 40	lb.	.40	@ .41
50	lb.	.40	@ .41
50-D	lb.	.40	@ .41
397	lb.	.75	@ .76
Retardex	lb.	.35	@ .40
Safex	lb.		@
SPDX	lb.	.70	@ .75
Super-sulphur No. 1	lb.		@
No. 2	lb.		@
Tensilac 39	lb.	.40	@ .42½
Thermlo F.	lb.		@
Thiocarbanilid	lb.	.20	@ .22
TMTT	lb.	3.00	@ 3.25
Trimene	lb.		@
base	lb.		@
Triphenyl guanidine	lb.	.58	@ .60
Tuads	lb.		@
Ulto	lb.	3.00	@
ZBX	lb.		@
Zimate	lb.		@
Acids			
Acetic 28% (bbls.)	100 lbs.	2.50	@ 2.65
glacial (carboys)	100 lbs.	8.85	@ 9.10
Sulphuric, 66°	ton	$15.50	@
Age Resisters			
Age-Rite Gel	lb.		@
powder	lb.		@
resin	lb.		@
white	lb.		@
Albasan	lb.		@
Antox	lb.		@
Stabilite	lb.	.57	@ .62
Alba	lb.	.70	@ .75
VGB	lb.		@
Zalba	lb.		@
Alkalies			
Caustic soda, 76% solid	100 lbs.	2.50	@
Antisun Materials			
Heliozone	lb.		@
Sunproof	lb.		@
Binders, Fibrous			
Cotton flock, dark	lb.	.08½	@ .10
dyed	lb.	.50	@ .85
white	lb.	.11	@ .16
Colors			
BLACK			
Bone, powdered	lb.	.05½	@ .15
Carbon (see Reenforcers)			
Drop (bbls.)	lb.	.05½	@ .17
Lampblack (commercial)	lb.	.07	@ .08
BLUE			
Blue toners	lb.	.60	@ 3.85
Brilliant blue	lb.	3.50	@
Prussian	lb.	.35	@ .37
Ultramarine	lb.	.06	@ .30
BROWN			
Iron oxide	lb.		@
Mapico	lb.	.17	@
Sienna, Italian, raw, powdered	lb.	.04½	@ .11
GREEN			
Brilliant green	lb.	3.50	@
Chrome, light	lb.	.23	@ .25½
medium	lb.	.26	@ .27½
Chromium oxide	lb.	.25	@ .32
Dark green	lb.	1.30	@
Green toners	lb.	1.00	@ 3.60
Light green	lb.	.70	@
ORANGE			
Cadmium sulphide	lb.	.65	@ .75
Orange lake	lb.	.50	@
Orange toners	lb.	1.60	@
ORCHID			
Orchid toners	lb.	1.05	@ 1.75
PINK			
Pink toners	lb.	1.00	@ 1.80
PURPLE			
Permanent purple	lb.	1.80	@
Purple toners	lb.	.60	@ 1.90
RED			
Antimony Crimson, R. M. P. No. 3	lb.	.48	@
Sulphur free	lb.	.52	@
7-A	lb.	.35	@
Z-2	lb.	.20	@
Cadmium	lb.		@
Chinese red	lb.	.85	@
Crimson red	lb.	.85	@
Iron Oxides bright pure domestic	lb.	.10	@ .12
bright reduced domestic	lb.	.03	@ .09
Indian (maroon), pure domestic	lb.	$0.09½	@ $0.12
Indian (maroon), reduced domestic	lb.	.03	@ .08
Rub-er-red	lb.	.08¼	@
Softex	lb.	.08¼	@
Mapico	lb.	.09	@
Medium red	lb.	.85	@
Oximony	lb.		@
Red toners	lb.	.95	@ 2.75
Scarlet red	lb.	1.50	@
Spanish red oxide	lb.	.02¼	@ .02¾
Venetian red (bbls.)	lb.	.01½	@ .05
WHITE			
Lithopone	lb.	.04½	@ .05
Albalith	lb.	.04½	@ .05
Azolith	lb.	.04½	@ .05
Cryptone No. 19	lb.	.06½	@ .07
Grasselli (50 lb. bags)	lb.	.04½	@ .04¾
(400 lb. bbls.)	lb.	.04¾	@ .05
Titanium oxide, pure	lb.	.20	@
Titanox "B"	lb.	.06½	@ .07
"C"	lb.	.07	@ .07½
Zinc Oxide AAA (lead free)	lb.	.06½	@ .07
Azo (factory): ZZZ (lead free)	lb.	.06½	@ .07
ZZ (leaded)	lb.	.06¼	@ .06¾
Z (8% leaded)	lb.	.06¼	@ .06¾
Black label (lead free) c. l., bags	lb.	.06½	@
Green label (lead free) c. l., bags	lb.	.06½	@
Green seal	lb.	.10¾	@ .10¾
Green seal, Anaconda	lb.	.10¾	@ .10¾
Kadox, black label	lb.	.10¾	@ .10¾
blue label	lb.	.09¾	@ .09¾
red label	lb.	.08	@ .08½
Red label (lead free) c. l., bags	lb.	.06½	@
Red seal	lb.	.09¾	@ .09¾
Red seal, Anaconda	lb.	.09¾	@ .09¾
Special	lb.	.07	@ .07½
White seal (bbls.)	lb.	.11¼	@ .11¾
White seal, Anaconda	lb.	.11¼	@ .11¾
XX green	lb.	.07	@ .07½
XX red	lb.	.06½	@ .07
Zinc sulphide (bbls.)	lb.	.13	@ .13½
YELLOW			
Cadmium sulphide	lb.	.65	@ .75
Chrome	lb.	.16½	@
Lemon yellow	lb.	1.50	@
Mapico	lb.	.12	@
Ochre, domestic	lb.	.01¾	@ .02¾
Yellow toners	lb.	2.50	@
Deodorant			
Rodo	lb.		@
Factice—See Rubber Substitutes			
Fillers, Inert			
Asbestine	ton	13.40	@ 13.50
Barytes, white, spot	ton	33.00	@
off color, spot	ton	25.00	@
Foam "A" (f.o.b. St. Louis)	ton	23.00	@
Basofor	lb.		@
Blanc fixe, dry	lb.	.03¼	@ .04½
pulp	ton	42.50	@ 45.00
Infusorial earth	ton	40.00	@ 80.00

New York Quotations

November 24, 1931

Prices Not Reported Will Be Supplied on Application

Kieselguhr	lb.	$0.03½	@
Suprex white, extra light	ton	70.00	@80.00
Tripoli	lb.	.02	@
Whiting			@
Chalk, imported...100	lbs.	1.00	@ 1.50
Domestic ...100	lbs.	1.00	@
Paris white, English cliffstone ...100	lbs.	1.50	@ 3.50
Quaker	ton		@
Sussex	ton		@
Witco (l. c. l.) (f.o.b. New York)	ton	20.00	@
Fillers for Pliability			
Flex	lb.		@
Fumonex	lb.	.02½	@ .06
P-33	lb.		@
Thermax	lb.		@
Velvetex	lb.	.02	@ .05
Finishes			
Mica, amber	lb.	.04½	@
Shellac, fine orange	lb.	.30	@
Starch, corn, pwd...100	lbs.	2.67	@ 2.87
potato	lb.	.05½	@ .06
Talc, domestic	lb.	.01¼	@
dusting	lb.	.01¼	@
French	ton	18.00	@22.00
Italian	lb.	.02½	@ .03
Pyrax A	ton		@
Inflating Material			
Ammonium carb., pwd...	lb.	.09½	@
lump	lb.	.09	@
Sponge paste	lb.	.30	@
Mineral Rubber			
Fluxrite (solid)	lb.		@
Genasco (fact'y)	ton	40.00	@42.00
Gilsonite (fact'y)	ton	37.14	@39.65
Granulated M. R.	ton		@
Hydrocarbon, hard	ton		@
Paradura (fact'y)	ton	62.50	@65.00
Parmr Grade 1	ton	23.00	@28.00
Grade 2	ton	23.00	@28.00
Robertson, M. R., solid (fact'y)	ton	32.00	@80.00
M. R. granulated	ton	35.00	@80.00
Mold Lubricants			
Sericite	lb.		@
Soapbark (cut)	lb.	.07½	@ .08
Soapstone, powdered	ton	15.00	@22.00
Oils			
Castor	lb.	.12½	@
Kerosene	gal.	.09	@
Mineral	gal.	.20	@
Poppy seed oil	gal.	1.70	@
Rapeseed, blown	gal.	.68	@ .70
Red oil, distilled	lb.	.07⅜	@ .07⅞
Rubber process	gal.	.25	@
Spindle	gal.	.30	@
Protective Colloids			
Bentonite (dispersion clay)	lb.	.02	@ .02½
Casein, domestic	lb.	.07½	@

Reenforcers			
Aluminum flake (sacks, c. l.)	ton	$21.85	@
(sacks, l.c.l.)	ton	24.50	@
Carbon Black			
Aerfloted arrow	lb.	.03½	@ .07
Cabot's certified black	lb.	.03	@
Century (works, La., c. l.) ...100	lbs.	3.00	@
Disperso (works, La., c. l.) ...100	lbs.	3.00	@
Dixie brand	lb.	.03½	@ .07½
Elastex	lb.	.03	@ .07
Excello	lb.	.04	@
Gastex (f. o. b. fact'y)			
contracts	lb.	.02½	@
carload	lb.	.02½	@
less carload	lb.	.03¾	@ .04¼
Kosmos brand	lb.	.03½	@ .07½
Micronex	lb.	.03½	@ .07½
Ordinary (compressed or uncompressed)	lb.	.03	@ .07
Supreme	lb.	.03	@
Clays			
Bento	lb.		@
Blue Ridge, dark	ton		@
China	lb.	.01¼	@
Dixie	ton		@
Dusto	lb.		@
Langford	ton		@
Lexo (works)	ton		@
Par	ton		@
Perfection	ton	20.00	@
Suprex No. 1	ton	8.00	@
No. 2, dark	ton	6.50	@
Glue, high grade	lb.	.20	@ .25
Rubber Substitutes or Factice			
Amberex	lb.	.15	@
Black	lb.	.07	@ .09
Brown	lb.	.06¼	@ .12
White	lb.	.08	@ .14
Softeners			
Burgundy pitch...100	lbs.	7.00	@
Atlas ...100	lbs.	6.50	@
Corn oil, crude	lb.	.05¾	@ .06
Cottonseed oil (P. S. Y.)	lb.		@
Degras	lb.	.03½	@ .04½
Fluxol	ton	18.00	@80.00
Fluxrite (fluid)	lb.		@
Palm oil (Lagos)	lb.	.04⅜	@ .04½
(Niger)	lb.	.03¾	@ .03⅞
(Witco)	lb.	.07½	@
Para-flux	gal.	.15	@ .17
Petrolatum, snow white	lb.	.07	@ .07½
Pine oil, steam distilled	gal.	.58	@
Pine pitch	lb.	.03	@
Pine tar (retort)	gal.	.22	@
Rosin K (280 lbs.)	bbl.	4.60	@
Rosin oil, compounded	gal.	.35	@
No. 3, deodorized	gal.	.57	@
No. 556, deodorized	gal.	.48	@
Rubberseed, drums	lb.	.07¾	@

Rubtack	lb.	$0.10	@
Tonox	lb.		@
Witco No. 20	gal.	.08	@
Solvents			
Benzol (90% drums)	gal.	.25	@
Carbon bisulphide (drums)	lb.	.05½	@ .12
tetrachloride	lb.	.06¼	@ .07
Dip-Sol	gal.		@
Dryolene, No. 9	gal.		@
Gasoline			
No. 303, drums (c. l.)	gal.		@
Tank cars	gal.	.12	@
Petrobenzol	gal.		@
Rub-Sol	gal.		@
Solvent naphtha (tanks)	gal.	.26	@
Stod-Sol	gal.		@
Troluoil	gal.		@
Turpentine, Venice	lb.	.20	@
dest distilled	gal.	.33	@ .36
Stabilizers			
Laurex, ton lots	lb.		@
Stearates			
Aluminum	lb.		@
Calcium	lb.		@
Magnesium	lb.		@
Zinc	lb.		@
Stearex B	lb.	.08	@ .12
Stearex flake	lb.	.09	@ .13
Stearic acid, dbl. pres'd.	lb.	.08	@ .08¼
Zinc laurate	lb.	.13½	@
Stearate	lb.	.18½	@ .21
Vulcanizing Ingredients			
Sulphur			
Rubber sulphur 99½%			
superfine (c.l.)..100	lbs.	2.20	@ 2.55
(l.c.l.) ...100	lbs.	2.60	@ 3.10
Soft rubber, 100%			
(c.l.) ...100	lbs.	2.60	@ 2.95
(l.c.l.) ...100	lbs.	2.95	@ 3.50
Sulphur chloride, drums	lb.	.06	@
Superfine commercial flour			
(bbls.) ...100	lbs.	2.55	@ 3.10
(bags) ...100	lbs.	2.20	@ 2.80
Velvet flour (240 lb. bbls.) ...100	lbs.	2.95	@ 3.50
(150 lb. bags)..100	lbs.	2.60	@ 3.15
Telloy	lb.		@
Vandex	lb.		@
(See also Colors—Antimony)			
Waxes			
Beeswax, white, com	lb.	.55	@
carnauba	lb.	.33	@
ceresin, white	lb.	.12½	@
montan	lb.	.06½	@
ozokerite, black	lb.	.28	@
green	lb.	.28	@
Paraffin			
122/124 crude, white scale	lb.	.02⅛	@
124/126 crude, white scale	lb.	.02⅛	@
125/127 fully refined	lb.	.02⅞	@ .03

Tire Production Statistics

	Pneumatic Casings—All Types			Solid and Cushion Tires		
	In-ventory	Production	Total Shipments	In-ventory	Production	Total Shipments
1928	10,217,708	58,457,873	55,721,937	152,120	508,223	512,602
1929	9,470,368	54,980,672	55,515,884	122,200	407,347	436,027
1930	7,202,750	40,772,378	42,913,108	75,871	204,340	250,635
1931						
January	7,165,846	2,939,702	2,995,479	75,205	12,631	13,072
February	7,628,520	3,188,274	2,721,347	73,338	11,358	12,915
March	8,011,592	3,730,061	3,297,225	68,584	11,424	16,152
April	8,025,135	3,955,491	3,945,525	64,369	11,610	15,445
May	8,249,856	4,543,003	4,332,137	61,272	11,369	15,566
June	8,357,768	4,537,970	4,457,509	57,462	11,764	15,364
July	7,935,565	3,941,187	4,369,526	54,692	13,370	16,051
August	7,117,037	3,124,746	3,967,987	50,994	11,643	15,758
September	6,526,762	2,537,575	3,145,488	45,995	10,371	12,786

	Inner Tubes—All Types			Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires		
	In-ventory	Production	Total Shipments	Cotton Fabric Pounds	Crude Rubber Pounds	Consumption of Motor Gasoline (100%) Gallons
1928	12,087,464	60,131,381	57,845,189	222,243,398	600,423,401	13,633,452,000
1929	10,245,365	55,062,886	56,473,303	208,824,653	598,994,708	14,748,552,000
1930	7,999,477	41,936,029	43,952,139	158,812,462	476,755,707	16,200,894,000
1931						
January	7,551,503	2,898,405	3,249,734	12,738,467	36,318,980	1,127,532,000
February	7,936,773	3,132,770	2,720,135	12,002,161	36,651,119	1,097,208,000
March	8,379,974	3,559,644	3,031,279	14,040,803	41,850,638	1,303,302,000
April	8,330,155	3,693,222	3,708,949	15,243,625	45,016,344	1,402,800,000
May	8,438,799	4,329,731	4,224,594	18,009,764	53,417,709	1,499,904,000
June	8,403,401	4,286,467	4,317,543	17,084,749	51,279,827	1,611,540,000
July	7,671,801	3,964,174	4,664,964	15,139,769	46,696,925	1,657,446,000
August	7,019,217	3,548,335	4,240,403	11,745,425	36,231,633	1,657,278,000
September	6,476,191	2,759,431	3,320,103	9,584,599	29,854,183	1,543,500,000

Rubber Manufacturers Association figures representing 80 per cent of the industry since January, 1929, with the exception of gasoline consumption.

Cotton and Fabrics

AFTER a sharp advance early in the month, which carried cotton prices from $5 to $6 a bale above the lows reached in September, the cotton market reacted. The rise was partly in sympathy with wheat prices and partly because of developments within the field. When the announcement came that the southern bankers and the Farm Board had given definite assurance that 7,000,000 bales of cotton would be withheld from the market, traders naturally reacted favorably. Another favorable factor was that the banks decided to lend banking support only to those planters who would curtail their crops next year. Since the large supply of cotton is one of the principal causes of low prices, these developments did much to relieve concern on that score.

But the expected advances in commodity prices did not materialize. The government increased its crop estimate; planters picked their cotton in unexpectedly large quantities; and news from the cotton cloth industry indicated that overproduction was imminent.

Speculators who had bought large quantities of cotton, expecting it to advance in price, unloaded their holdings when the market turned downward. Trade buying, however, lent firmness to the market; so the decline was orderly.

The unseasonal weather has retarded the demand for cotton cloth, and a few manufacturers in the industry have been operating night and day without regard to the benefit of the industry as a whole. If curtailment of output is decided upon, these manufacturers will be brought into relief.

While the uneasiness about the cotton cloth industry has depressed the market, the lack of selling pressure from the South and the increased demand for cotton from the Far East are bright spots. If the present lag in consumption can be taken up, the market may assume a more cheerful aspect.

Week ended October 31. After the drop of from 26 to 28 points on Monday, following the heavy ginnings report, the cotton market fluctuated in a narrow range but was firm toward the end of the week.

From the last ginnings report on October 1 to the latest one on October 18, 4,087,627 bales of cotton were turned out, the highest on record. This brings the total to date to 9,498,041 bales, or more in line with the size of the crop. It compares with a figure of 9,254,968 to the same date last year and with 9,099,082 in 1929. The number of ginnings in this year was exceeded only in 1925.

This sharply increased movement of the crop naturally led traders to expect a sharp jump in hedging operations. They are wary, as a consequence, and buy only on a scale down.

The New York Cotton Exchange Service issued the following report on consumption: "Consumption of the American staple is running much higher than last season in this country, Great Britain, and the Orient, but is running much lower on the Continent of Europe. In August and September the United States used 866,000 bales, against 718,000 a year ago; Great Britain, 151,000, against 128,000; and the Orient, 331,000, against 177,000; but the Continent used only 522,000, against 618,000."

Reports continue of increased activity in the British cotton mills, because of the lower value of the pound. Sales of cotton cloth in this country are expected to show up good for October, according to preliminary estimates.

Southern bankers imparted a note of cheer into the market when they announced they had received pledges for the withholding of 4,000,000 bales of cotton from the market, or 500,000 bales more than agreed upon with the Farm Board. The latter consented to withhold 3,500,000 bales from the market if the bankers could secure pledges and would extend credit for holding a similar amount of cotton. It was expected the plan would be carried out as agreed.

Prices at the close of October 31 were:

Position	High	Low	Close	Previous Close
Dec.	6.74	6.63	6.63/64	6.63/65
Jan.	6.81	6.70	6.70/72	6.70/71
Mar.	6.96	6.85	6.85/87	6.84/85
May	7.15	7.05	7.05/08	7.03
July	7.34	7.24	7.24	7.21

Week ended November 7. Private crop estimates weakened the cotton market early in the week, but the sensational rise in wheat and the strength in the stock market lent firmness to cotton prices, and closing prices were up at the end of the week.

The private crop estimates, anticipating the government report to be issued next week, ranged from 15,243,000 to 16,748,000 bales, the latter almost 500,000 bales above the figures in the last report. The average of the reports issued during the week was about 16,150,000 bales, and a survey of the opinions of the men on the exchange revealed an expectation of about 16,650,000 bales.

A good deal of selling was attributed to the cooperatives. It was said that they were selling futures and buying spot cotton, with the result that spot cotton was selling at a much higher level than was justified by other prices.

The strength of the market came from trade buyers, who bought heavily on every drop in prices. Cotton cloth production figures for October are expected to be favorable; while output in the last week of the month was greater than the seasonal increase.

Although not so sensational as the rise in wheat prices, the jump in cotton prices in the last month has been encouraging. In the first part of October prices were the lowest in 30 years. Since that time prices have improved from $5 to $6 a bale. Credit for the improvement can largely be given to the acceptance of the plan for withholding 7,000,000 bales of cotton from the market through the cooperation of southern bankers and the Federal Farm Board. The most effective restrictive measure yet to be proposed may soon be put into effect—that of loaning money only to those farmers who will cut their production.

Consumption is being accelerated and is running about 15 per cent above the 1930 rate. Stocks of cotton cloth in the hands of manufacturers are about 40 per cent below last year's level, and exports to Oriental countries are greater than a year ago.

In brief these are the events which are offsetting the excessive stocks of cotton on hand.

Prices at the close of November 7 were:

Position	High	Low	Close	Previous Close
Dec.	6.73	6.62	6.62	6.67
Jan.	6.80	6.70	6.70/71	6.75
Mar.	6.96	6.84	6.84/86	6.90/91
May	7.13	7.02	7.03/04	7.08/09
July	7.29	7.17	7.17/20	7.23/24
Oct.	7.50	7.41	7.41	7.45

Week ended November 14. The November 1 crop estimate was 3.8 per cent higher than the estimate a month previous and the increase of 619,000 bales in the forecast will make the present crop the second largest on record. In 1926 the crop reached 17,977,000 bales. The present crop is expected to be 16,903,000 bales, compared with 13,932,000 bales in 1930, and with the 1925-29 average of 15,268,000 bales.

Cotton ginnings were also heavy. Prior to November 1, 12,129,546 bales had been ginned from the 1931 crop, against 10,863,896 in 1930 and 10,891,940 in 1929. The Department of Agriculture explained the

COTTON BEAR POINTS

1. Cotton ginned prior to November 14 was 14,210,301 running bales, against 11,962,827 last year.
2. Heavy production of cotton cloth may necessitate curtailed output, thus lowering demand for cotton from manufacturers.
3. The total stock of all kinds of cotton including that unpicked was estimated, as of October 31, to be 19,946,000 bales, against 14,868,000 bales last year, and 17,101,000 bales in 1926-27, by the New York Cotton Exchange Trading Service.
4. Total cotton exports have been running behind those of last year. On November 15 they were 500,000 bales short of the previous year's figures.
5. The November 1 crop estimate by the government for this year's output was 16,903,000 bales, the second largest in history, and 619,000 bales higher than the October estimate.
6. Stocks of cotton cloth on hand on October 31 were 225,833,000 yds., against 244,924,000 yds. at the beginning of the month.
7. American cloth manufacturers are experiencing increased competition from British manufacturers because of the advantage in price to the British, caused by the drop in the value of the pound.
8. England's tariff will block some of our trade with her.
9. The weather has been unusually favorable for the crop.
10. Consumption of cotton cloth is lagging, and prices are being cut.

COTTON BULL POINTS

1. The plan of southern bankers, the Farm Board, and Cooperatives for holding 7,000,000 bales from the market has been accepted by those concerned.
2. Exports to the Orient so far this season have been more than 100 per cent over those of last year. In September, shipments to the Far East were 140 per cent more than in the preceding month.
3. Manchester mills are operating at an increased rate since England went off the gold standard, and better silver prices have improved demand from India and China.
4. India's cotton supply is tentatively estimated at 6,880,000 bales, against 7,592,000 last year and 8,099,000 two years ago.
5. Unfilled orders of cotton cloth increased 51.7 per cent during October; sales were 146.9 per cent of production.
6. Trade buying has been heavy, and a large amount of cotton has gone from the hands of speculators into those of the trade.

WEEKLY AVERAGE PRICES OF MIDDLING COTTON

Week Ended	Cents per Pound
Oct. 31	6.71
Nov. 7	6.66
Nov. 14	6.63
Nov. 21	6.29

increase over previous estimates by saying that the weather had been exceptionally fine in October and the potential loss for which they had made allowance in their former report had not materialized.

But in spite of this report, the cotton market advanced from 13 to 16 points on Monday. The crop reports were overruled by the sharp rally in the price of silver and by the cloth statistics. Later in the week, however, the market turned reactionary in sympathy with the wheat and silver markets.

On Monday the Association of Cotton Textile Merchants of New York released its report for October. It revealed that unfilled orders for this month had shown the largest increase in any month since the figures had been first compiled. The increase during October was 51.7 per cent; total orders on hand were 344,639,000 yds. Sales for October were 146.9 per cent of production; shipments were 216,207,000 yds., against production of 227,116,000 yds.; sales were 131 per cent of the goods on hand at the end of the month. Domestic mill consumption of raw cotton, however, was at a lower rate than in September.

Two developments creating interest are the accelerated pace of activities in the British cotton factories and the increased buying from the Far East. Since Britain went off the gold standard cotton manufacturers have been able to sell cotton more cheaply, and the rise in the price of silver has increased the buying power of Oriental countries.

Prices at the close of November 14 were:

Position	High	Low	Close	Previous Close
Dec.	6.45	6.33	6.34/35	6.45/46
Jan.	6.54	6.44	6.46	6.55
Mar.	6.71	6.61	6.63/64	6.71/72
May	6.88	6.78	6.81	6.90/91
July	7.07	6.97	6.99/7	7.09/10
Oct.	7.32	7.24	7.24	7.34

Week ended November 21. After declining for a week, the cotton market received 2 news items on Saturday that aggravated the picture—the reports of heavy ginnings and an unsatisfactory demand for cotton goods.

Ginnings from November 1 to 14 were the heaviest on record for that period and led some traders to believe that the next government crop report might be revised upward. The total ginned prior to November 14 was 14,210,301 running bales, against 11,962,827 last year. The latest crop estimate was 16,903,000 bales. The government estimate for ginnings was higher than that of most private estimates. Figures of 13,472,000, 13,852,000, and 13,700,000 bales were forecast by private sources.

Other factors affecting the decline were the liquidation in December contracts prior to the approach of notice day, and the weakness in stocks, silver, and wheat.

Production of cotton cloth is climbing, leading to fears that curtailment may be necessary. The adjusted index of carded cotton cloth production maintained by *The New York Times* was at 92.4 for the week ended November 14, compared with 89.6 for the preceding week and 77.0 for the corresponding week last year.

Reports were current in the market that Japan was buying cotton in unusually large amounts, and the reports seem to have some basis in fact because it was revealed that exports to the Orient so far this season have totaled 998,000 bales, against 484,000 a year ago. Total exports, however, have been about 500,000 bales behind those of last year.

Rains reported in the West for the last few days may lower the grade of any cotton in the field but it is felt that most of the cotton has been picked; and some shippers would be glad to have some low-grade cotton.

Prices at the close of November 21 were:

Position	High	Low	Close	Previous Close
Dec.	6.06	6.00	6.00/01	6.07/08
Jan.	6.16	6.11	6.12/13	6.18
Mar.	6.36	6.30	6.30/31	6.37
May	6.55	6.48	6.48	6.55/57
July	6.72	6.66	6.66	6.74/75
Oct.	6.98	6.92	6.92	6.98/99

On November 23 the market declined to new low levels. Later it rallied and showed moderate gain. Spot middlings were steady and unchanged at 6.10 cents. On the 24th cotton futures rose $1.25 a bale, ending steady. Spot rose 25 points to 6.35 cents.

Cotton Fabrics

DUCKS, DRILLS, AND OSNABURGS. The market has lost the momentum that characterized it a month ago. It can hardly be stated that there are any outstanding features other than general lack of demand.

RAINCOAT FABRICS. The fall seasonal business in raincoats showed some increase in volume but lacked the stimulus that rainy weather would have imparted. A few numbers are selling in fair quantities although at very close to their cost. In other numbers business is very dull and awaits the advent of inclement weather to give it action.

SHEETING. October and early November business was considerably above that of the corresponding period in the recent past, and stocks on hand were reduced to the lowest they have been since the statistics were compiled. While consumption has increased, it does not equal production capacity. It is necessary for consumption and production more nearly to balance before a rising market occurs. This condition can be accomplished only by production curtailment. Today merchandise is selling very unprofitably and even at a loss in the majority of instances.

TIRE FABRICS. During the past month a large volume of business for 1932 has been placed in tire fabrics in anticipation that cotton will advance and tire fabrics will be much higher. Commitments, consequently, made at the present low prices are destined to prove profitable for any delivery during 1932.

CELANESE. Very little celanese fabric is being sold at present to the rubberizing trade. Prices are quoted unchanged for the standard varieties of dyed and finished fabrics.

New York Quotations

November 24, 1931

Drills

38-inch 2.00-yard	yd.	$0.09 @
40-inch 3.47-yard		.05 5/16 @
50-inch 1.52-yard		.12 1/2 @
52-inch 1.90-yard		.10 @
52-inch 2.20-yard		.08 5/8 @
52-inch 1.85-yard		.10 1/4 @

Ducks

38-inch 2.00-yd. D. F.	yd.	.09 @
40-inch 1.45-yard S. F.		.13 @
72-inch 1.05-yard D. F.		.20 @
72-inch 16.66-ounce		.21 @
72-inch 17.21-ounce		.22 @

MECHANICAL

Hose and belting	lb.	.19 @

TENNIS

52-inch 1.35-yard	yd.	.14 @

Hollands

RED SEAL

36-inch	yd.	.12 1/2 @
40-inch		.13 @
50-inch		.19 @

GOLD SEAL

40-inch, No. 72	yd.	.15 @

Osnaburgs

40-inch 2.35-yard	yd.	.07 7/8 @
40-inch 2.48-yard		.07 1/2 @
40-inch 3.00-yard		.06 7/8 @
40-inch 10-oz. part waste		.08 3/4 @
40-inch 7-oz.		.06 1/2 @
37-inch 2.42-yard		.07 3/4 @

Raincoat Fabrics

COTTON

Bombazine 64 x 60	yd.	.08 1/2 @
Bombazine 60 x 48		.07 1/2 @
Plaids 60 x 48		.09 3/4 @
Plaids 48 x 48		.08 3/4 @
Surface prints 64 x 60		.11 1/4 @
Surface prints 60 x 48		.10 1/4 @
Print cloth, 38 1/2-in., 60 x 48		.03 3/4 @
Print cloth, 38 1/2-in., 64 x 60		.03 @

CELANESE, dyed and finished

Permanent moire	yd.	.90 @
Faille		.80 @
Taffeta, 84 x 60		.45 @
Taffeta, 104 x 76		.52 1/2 @
Taffeta, 200 x 64		.80 @

SHEETINGS, 40-INCH

48 x 48, 2.50-yard	yd.	.05 5/8 @
48 x 48, 2.85-yard		.05 1/8 @
64 x 68, 3.15-yard		.05 3/4 @
56 x 60, 3.60-yard		.05 @
44 x 48, 3.75-yard		.04 1/8 @
44 x 40, 4.25-yard		.03 7/8 @

SHEETINGS, 36-INCH

48 x 48, 5.00-yard	yd.	.03 3/8 @
44 x 40, 6.15-yard		.03 @

Tire Fabrics

BUILDER

17 1/4 oz. 60" 23/11 ply Karded peeler	lb.	.22 @
17 1/4 oz. 60" 10/5 ply Karded peeler	lb.	.20 @

CHAFER

14 oz. 60" 20/8 ply Karded peeler	lb.	.22 @
12 oz. 60" 10/4 ply Karded peeler	lb.	.18 @
9 1/4 oz. 60" 20/4 ply Karded peeler	lb.	.24 @
9 1/4 oz. 60" 10/2 ply Karded peeler	lb.	.20 @

CORD FABRICS

23/5/3 Karded peeler, 1 1/16" cotton	lb.	.22 @
23/4/3 Karded peeler, 1 1/16" cotton	lb.	.24 @
15/3/3 Karded peeler, 1 1/16" cotton	lb.	.20 @
13/3/3 Karded peeler, 1 1/16" cotton	lb.	.19 @
7/2/2 Karded peeler, 1 1/16" cotton	lb.	.19 @
23/5/3 Karded peeler, 1 3/4" cotton	lb.	.27 @
23/5/3 Karded Egyptian, Egyptian uppers, cotton	lb.	.34 @
23/5/3 Combed Egyptian	lb.	.40 @

LENO BREAKER

8 1/4 oz. and 10 1/4 oz. 60" Karded peeler	lb.	.22 @

DAVOL
QUALITY SERVICE

ESTABLISHED 1874

Special Molded or Handmade Goods Made to Order

FINE RUBBER GOODS FOR THE DRUG, HOSPITAL, STATIONER AND DENTAL TRADES

DAVOL RUBBER COMPANY
PROVIDENCE, RHODE ISLAND
U. S. A.

Sample Rooms
NEW YORK BOSTON
CHICAGO SAN FRANCISCO
Cable Address
DAVOL, PROVIDENCE
WESTERN UNION CODE

Regular and Special Constructions of

COTTON FABRICS

Single Filling Double Filling and

ARMY

Ducks

HOSE and BELTING

Ducks

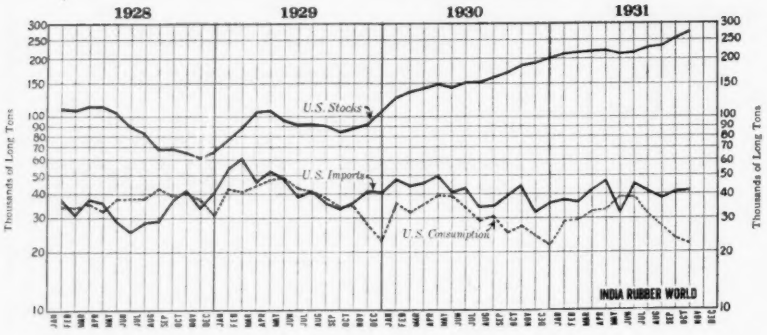
Drills

Selected

Osnaburgs

Curran & Barry
320 BROADWAY
NEW YORK

Imports, Consumption, and Stocks



United States Stocks, Imports, and Consumption

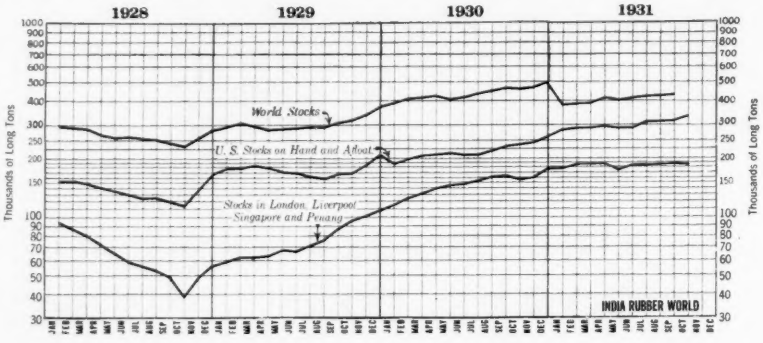
CRUDE rubber consumption by manufacturers in the United States for October decreased 5.8 per cent as compared with September. The usual seasonal decline is 3.0 per cent. October consumption is estimated at 22,277 long tons, as compared with 23,638 long tons for September and 27,516 long tons for October, 1930, according to The Rubber Manufacturers Association.

Crude rubber imports for October totaled 41,395 long tons, an increase of 2.2 per cent over the September figure of 40,505 long tons, but a decrease of 5.3 per cent under October, 1930.

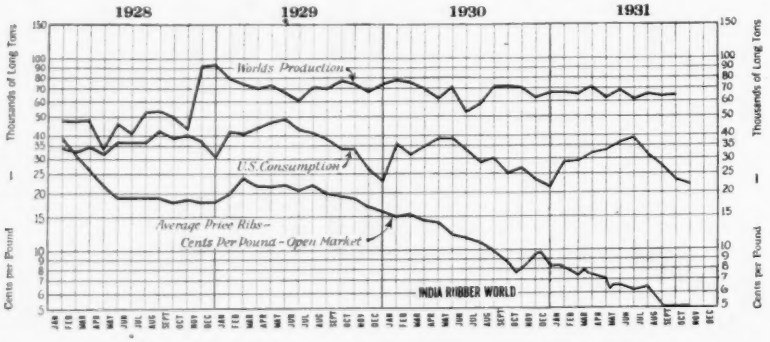
The estimated total domestic stocks of crude rubber on hand October 31 were 273,456 long tons, an increase of 7.5 per cent over September and 47.4 per cent over October 31, 1930.

Crude rubber afloat for United States ports on October 31 was estimated at 68,427 long tons as against 62,420 long tons on September 30 and 51,123 long tons on October 31, 1930.

The following world's rubber consumption forecast is taken from Bleecker Bik & Co. in the *Rubber Age* of London. There are 36,000,000 cars in service throughout the world which will require tire replacement at the rate of 2½ tires per car, figured as 90,000,000 tires in round numbers. Probable new car construction of 5,000,000 will require 25,000,000 tires. The total 115,000,000 tires at 12 pounds crude rubber will absorb about 615,000 tons. Other uses for rubber will account for 120,000 tons. Reduced consumption of reclaim may add 60,000 tons. This brings the estimated total consumption for 1931 to 795,000 tons or 92,000 tons more than in 1930.



World, United States, London, Liverpool, Singapore and Penang Stocks



World's Production, U. S. Consumption, and Price of Ribs

LONDON AND LIVERPOOL STOCKS

Week Ended	Tons	
	London	Liverpool
Oct. 31	76,698	56,816
Nov. 7	76,323	56,284
Nov. 14	75,256	55,933
Nov. 21	74,322	56,339

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Net Imports* Tons	U. S. Consumption Tons	U. S. Stocks on Hand† Tons	U. S. Stocks Afloat† Tons	United Kingdom Stocks†‡ Tons	Singapore and Penang Stocks, Etc.†‡ Tons	World Production (Net Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks U. S. A., U. K., Singapore, and Penang†‡ Tons
1926	411,962	358,415	72,510	51,238	51,320	26,443	621,900	542,000	273,060
1927	431,807	372,528	100,130	47,938	66,261	25,798	607,300	593,866	298,780
1928	446,421	442,227	66,166	68,764	22,603	32,905	653,837	686,945	284,198
1929	561,454	466,475	105,138	62,389	73,253	35,548	860,404	804,820	371,425
1930	488,343	375,980	200,998	56,035	120,575	46,003	815,835	702,935	492,165
1931									
January	37,098	28,557	209,487	56,188	124,336	48,306	65,714	49,620	382,129
February	36,645	28,797	212,834	63,680	126,874	48,164	65,719	59,970	387,872
March	40,338	32,788	218,317	63,133	133,013	48,300	71,218	59,980	399,630
April	46,648	33,321	228,383	56,700	138,144	44,857	63,395	51,200	411,384
May	31,720	37,817	220,799	73,564	138,945	43,212	68,628	63,190	402,936
June	45,776	37,916	225,536	69,421	136,233	46,573	62,090	64,050	409,132
July	41,004	31,937	234,822	66,873	135,916	50,021	66,600	58,240	420,759
August	38,370	27,586	240,817	61,469	136,956	48,010	65,392	54,750	425,782
September	40,505	23,638	254,324	62,420	134,556	46,068	66,529	57,200	434,949
October	41,395	22,277	273,456	68,427	.....	.....	.....	.....	.....

*Including liquid latex, but not guayule.
†Stocks on hand the last of the month or year.
‡W. H. Rickinson & Son's 1931 figures.

CHARLES T. WILSON CO., Inc.

99 Wall Street **New York City**

Akron Office: 507 Second National Bldg.
Telephone: Franklin 4185-4186
Boston Representative: ERNEST JACOBY, 79 Milk St.
Telephone: Liberty 8371
Los Angeles Representative: W. K. THOMPSON, 228 West Fourth St.
Telephone: Michigan 9797

DIRECT IMPORTERS
of

CRUDE RUBBER

LIQUID LATEX
NORMAL AND CONCENTRATED

Manufacturers' inquiries solicited and will receive prompt attention

Rubber Scrap

VERY little interest is shown in rubber scrap either by collectors or erstwhile consumers. The seasonal decline in scrap collection began earlier than usual last month because of lack of consuming demand.

BOOTS AND SHOES. Collections are severely restricted by the very low prices offered. These are not sufficient to pay the cost of sorting the mixed qualities gathered by the collectors into black, colors, and arctics and other cloth goods. The market quotations of all grades remain unaltered from a month ago except the black grade which at present is down ¼-cent per pound.

INNER TUBES. Collections run light. No. 1, floating, declined ¾-cent from the quotation one month ago. No. 2, compounded, is down ⅛-cent, but consuming demand is very well maintained in these grades.

TIRES. All grades are fairly active with collections moderate. Freight rates do not permit economical movement of scrap tires at present prices, but they must be disposed of locally at a very narrow margin. In Raleigh, N. C., the local scrap tire supply is reported as being consumed for fuel in the city incineration plant in order to save coal.

Mixed and beadless tires are quoted down 75 and 50 cents a ton, respectively from last month. Solids are in very good demand with the supply far from plentiful. Western accumulations are utilized locally. Export demand, which is increasing, is supplied entirely by collections centering at Atlantic seaboard points. Clean mixed trucked grade advanced $2 to $2.50 a ton. Light gravity grade is unchanged from last month.

MECHANICALS. The full list of mechanical grades remain unchanged and are in light demand.

HARD RUBBER. No. 1 hard rubber is steady at 8¾ to 9 cents unchanged from last month.

CONSUMERS' BUYING PRICES

Carload Lots

Delivered Eastern Mills

November 24, 1931

		Prices	
Boots and Shoes			
Boots and shoes, black	100 lb.	$0.75	@$1.00
Colored	100 lb.	.625	@ .75
Untrimmed arctics	100 lb.	.625	@ .75
Tennis shoes and soles	100 lb.	.50	@ .60
Inner Tubes			
No. 1, floating	lb.	.03	@ .03½
No. 2, compound	lb.	.01⅝	@ .01¾
Red	lb.	.01¾	@ .01⅞
Mixed tubes	lb.	.01⅝	@ .01⅝
Tires			
Pneumatic Standard			
Mixed auto tires with beads	ton	8.00	@ 8.50
Beadless	ton	12.50	@13.00
Auto tire carcass	ton	12.00	@12.50
Black auto peelings	ton	19.50	@20.00
Solid			
Clean mixed truck	ton	24.00	@26.00
Light gravity	ton	30.00	@31.00
Mechanicals			
Mixed black scrap	lb.	.00½	@ .00¾
Hose, air brake	ton	8.00	@ 9.00
Garden, rubber covered	lb.	.00¾	@ .00½
Steam and water, soft	lb.	.00½	@ .00⅝
No. 1 red	lb.	.01¼	@ .01⅜
No. 2 red	lb.	.01	@ .01⅛
White druggists' sundries	lb.	.01⅛	@ .01¾
Mechanical	lb.	.01	@ .01⅛
Hard Rubber			
No. 1 hard rubber	lb.	.08¾	@ .09

Editor's Book Table

New Publications

The Vanderbilt News. R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. The October, 1931, issue of this publication comprises a selection of articles well calculated by their importance to prove of interest to the rubber technologist. The titles are: "Natural and Artificial Aging—Can They Be Correlated?" "Curing Hard Rubber in Boiling Water and in Calcium Chloride Solutions;" "The Stiffening Effects of Benzidine and p-Aminophenol on Uncured 30 Per Cent Insulated Wire Stocks;" "The Effect of Light on Age-Rite Antioxidants;" "Tuads and Tire-Curing Bags;" "One Minute Cures for Sole Stocks."

"Barco Swivel Joints." Barco Mfg. Co., 1801-15 Winnemac Ave., Chicago, Ill. This 4-page bulletin, illustrates, describes, and lists the various Barco swivel joints and shows their application in piping a platen press. Barco fittings are made for standard combined swivel and angle joints and also for swivel joints for rotary movement only.

"Bristol's Free Vane Air Operated Controller." The Bristol Co., Waterbury, Conn. This catalog, No. 4001, illustrates and describes the newest development in temperature control instruments which incorporates unusual features of accuracy, dependability, and simplicity. The principle employed is a new departure in pneumatic control. It permits one actuating element to move a pen arm making a chart record, and to operate a control system.

"Symposium on Abrasion Testing of Rubber." American Society for Testing Materials, Philadelphia, Pa. This authorized reprint from the proceedings of this society includes the papers and the discussions on abrasion testing of rubber presented at the Thirty-fourth Annual Meeting of the A. S. T. M. held in Chicago, June 22-26, 1931. Five papers are included in which are discussed the results obtained by several types of abrasion machines. The symposium has focused attention on the requirements for an ideal abrasion test and, it is expected, will stimulate study that will result in accomplishing great improvements over present methods for abrasion testing of rubber.

"Woodstock, The Safety Line. Real Wear in Every Pair. In Stock Catalogue No. 1." The Woodstock Rubber Co., Ltd., Woodstock, Ont., Canada. This profusely illustrated 32-page booklet describes in English and French the wide variety of Woodstock footwear, ranging from hip length boots for men to dainty fur lined carriage boots and neat rubbers for women and children.

"'U. S.' Sportline." United States Rubber Co., Footwear Section, Sporting Goods Section, Naugatuck, Conn. In this 12-page booklet the United States Rubber Co. illustrates and describes its sport footwear, from low tennis sneakers to hip boots and waders.

Book Reviews

"A. S. T. M. Tentative Standards 1931." American Society for Testing Materials, 1315 Spruce St., Philadelphia, Pa. Paper or cloth, 1,008 pages, 6 by 9 inches. Indexed. Illustrated.

This volume contains 180 tentative standards, 30 of which relate to rubber products, insulating materials, and textiles. There is a comprehensive subject index and a table of contents which lists, under the various materials covered, the respective standards. In addition a complete list of all the standards and tentative standards of the society in effect September 1 is included.

"Chemistry of Engineering Materials." Robert B. Leighou, McGraw-Hill Book Co., Inc., New York and London, 1931. 3rd Ed., Cloth, 684 pages, 5¼ by 8 inches. Illustrated. Indexed.

This work, one of the popular International Chemical Series texts, has been newly revised to bring the subject matter into conformity with the advances made in the past 6 years. The author presents to his readers a brief yet comprehensive and up-to-date account of the nature, origin, and industrial applications of the raw materials of modern industry.

In the chapter on rubber 19 pages are given to a condensed and accurate view of the sources and the preparation of crude rubber, methods of its vulcanization, the functions of accelerators and other materials used in compounding soft rubber and ebonite. Reclaims, synthetic rubber, and factice are also briefly considered. The work is as closely up-to-date as can well be expected considering the rapid pace of current industrial development.

"Leaders or Pioneers." John Robertson Co., 121-37 Water St., Brooklyn, N. Y. This 4-page folder, dedicated to the company's customers, stresses the fact that John Robertson invented the first lead-encasing press nearly 50 years ago. Since then the company he founded has been a leader in supplying lead-encasing machinery and allied equipment to the rubber industry.

"Carbon Tetrachloride." The Roessler & Hasslacher Chemical Co., 350 Fifth Ave., New York, N. Y. In this booklet are compiled all the available data on the properties, specifications, and commercial applications of the non-flammable solvent, carbon tetrachloride. Other important chapters treat of toxicity, stability, flash point data, flammable solvent mixtures, test methods, etc.

"Instructions for Removal and Application of Tires on Drop Center Rims." The Rubber Manufacturers Association, Inc., 250 W. 57th St., New York, N. Y. In this 8-page pamphlet the repair man and the motorist are given complete information in detail for removing or applying tires on drop center rims. The instructions are illustrated by a series of 12 pictures that represent the successive steps of changing tires.

CLASSIFIED ADVERTISEMENTS

SITUATIONS WANTED

RUBBER CHEMIST, AGE THIRTY-SEVEN, SINGLE, FIFTEEN years' varied experience in the analysis, compounding, control, testing and reclaiming of rubber goods, is available for any suitable position. Address Box No. 11,072, care of INDIA RUBBER WORLD.

RUBBER CHEMIST AND COMPOUNDER, WILLING TO GO abroad. Thoroughly familiar with compounding, testing, and factory processes in the manufacture of mechanicals, including hard and soft molded goods, hose, tubing, tapes, matting and flooring, wrapped goods, etc. Also experienced in dipped goods. Nine years' experience. Address Box No. 11,074, care of INDIA RUBBER WORLD.

GRADUATE MECHANICAL ENGINEER, WITH TWELVE YEARS' experience in golf-ball manufacture. Thoroughly conversant with all modern methods of manufacture and distribution. Address Box No. 11,075, care of INDIA RUBBER WORLD.

SITUATION OPEN

DEVELOPMENT ENGINEER

Development department of large nationally known rubber company offers a good opportunity to a graduate engineer for work on tires and tubes. Applicant must be of an inventive turn of mind, well grounded in mathematics, have a natural desire for investigation and research, and be capable of following an assignment to completion. Rubber experience desirable. State age, education, experience, and salary desired. Address Box No. 11,073, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

WE CAN FINANCE, DEVELOP, MANUFACTURE, AND MARKET, on a satisfactory basis, your ideas for rubber products. Address Box No. 11,070, care of INDIA RUBBER WORLD.

NEW ENGLAND DISTRIBUTER DESIRES CONNECTION AS exclusive factory distributer of complete mechanical rubber lines and can offer proper representation with a good volume. Address Box No. 11,071, care of INDIA RUBBER WORLD.

UNION TALC COMPANY
PURE WHITE TALC
147 Nassau St., New York, N. Y.

Milling for the Trade
Let us bid on your milling, calendering or spreading jobs.
SPECIAL COMPOUNDS DEVELOPED
Rubber & Asbestos Corporation
26-38 Cornelison Avenue, JERSEY CITY, N. J.

INTERNATIONAL PULP CO.
41 Park Row, NEW YORK, N. Y.
SOLE PRODUCERS
ASBESTINE
REG. U. S. PAT. OFF.

MECHANICAL MOLDED RUBBER GOODS
We Solicit Your Inquiries
THE BARR RUBBER PRODUCTS COMPANY
SANDUSKY, OHIO

Rubber Molds — Tools — Dies — Special Machinery—and Mechanical Rubber Goods Molds
THE COLUMBIA RUBBER MOLD CO.
968 East 69th Place, Cleveland, O.

Fort Hill Engraving Co. Inc.
113 Pearl Street . . . . . Boston, Mass.
ESTABLISHED 1908
Producers of Dies for Embossing Rubber Soles—Outsole Medallions—Size and Width Stamps—Ankle Patch Dies—Stamping Dies for all kinds of rubber products.

PURE GUM THREAD AND TAPE
FOR GOLF BALL AND KINDRED MANUFACTURE
COMPOSITION CURE BEHAVIOR **UNIFORM** STRENGTH (Grainless) SURFACE FRICTION CROSS SECTION
Long aging, non-blooming, unaffected by accelerators, vulcanizing agents or heat during manufacture of vulcanized cover. Has all the advantages and superiority typical of accelerated stock cured at low temperature. The only thread cut absolutely orthogonally available in United States and Canada.
EACH THREAD INDIVIDUALLY INSPECTED BY EXPERTS
Address Inquiries: MATERIALS DIVISION
I. T. GURMAN, Consulting Chemical Engineer
Golf Ball Specialist
64 FAULKNER STREET MALDEN, MASS.
PLANT LAYOUT AND OPERATION
DEVELOPMENTS FORMULAS PROCESSES

REVERTEX
(Highly Concentrated [About 73%] Rubber Latex)
SOLE DISTRIBUTORS FOR U. S. A. AND CANADA:
Revertex Corp. of America
40 RECTOR STREET NEW YORK, N. Y.

(*Advertisements continued on page* 109)

Low and High New York Spot Prices

	November 1931*	November 1930	November 1929
PLANTATIONS			
Thin latex crepe	$0.04 11/16 @ $0.05 3/16	$0.08 5/16 @ $0.09 3/4	$0.16 1/2 @ $0.19 1/16
Smoked sheet, ribbed	.04 7/16 @ .05	.08 1/4 @ .09 1/2	.15 3/4 @ .18 1/16
PARAS			
Upriver fine	.05 3/4 @ .06 1/4	.12 3/4 @ .12 1/2	.16 1/2 @ .19 3/4
Upriver coarse	Nominal	.07 3/4 @ .07 1/2	.08 3/4 @ .10 1/2
Upper caucho ball	Nominal	.07 1/4 @ .07 1/2	.08 1/4 @ .10 1/2

*Figured to November 24, 1931.

World Rubber Shipments—Net Exports

Long Tons

	Calendar Years		1931			
	1929	1930	July	Aug.	Sept.	Oct.
British Malaya						
Gross exports	579,524	547,043	43,658	42,832	44,336	45,911
Imports	161,612	133,876	11,995	9,063	8,369	9,955
Net	417,912	413,167	31,663	33,769	35,967	35,956
Ceylon	80,795	76,406	4,517	3,763	*4,202	*5,105
India and Burma	11,720	10,782	715	406	.....	.....
Sarawak	11,079	10,310	801	692	701	872
British No. Borneo	7,381	7,052	*500	*500	*500	*500
Siam	5,024	4,349	316	210	218	338
Java and Madura	66,010	69,755	6,671	6,397	5,578	.....
Sumatra E. Coast	87,589	79,396	7,510	7,044	7,358	.....
Other N. E. Indies	134,732	115,254	10,711	8,641	8,389	.....
French Indo-China	10,147	9,877	859	*983	*922	*844
Amazon Valley	21,148	14,260	1,565	856	745	1,284
Other America	996	516	.....	.....	.....	.....
Guayule	1,275	1,095	.....	.....	.....	.....
Africa	4,596	3,961	186	241	*170	*170
Totals	860,404	816,180	66,014	63,502	.....	.....

* Estimate. *Compiled by Rubber Division, Department of Commerce, Washington, D. C.*

World Rubber Absorption—Net Imports

Long Tons

	Calendar Years		1931		
	1929	1930	July	Aug.	Sept.
CONSUMPTION					
United States	472,000	376,107	32,217	27,828	23,845
United Kingdom	72,023	74,760	6,262	4,192	8,152
NET IMPORTS					
Australia	15,886	5,354	627	283	269
Austria	3,324	2,365	322	390	58
Belgium	9,445	10,740	1,507	955	.....
Canada	35,453	28,793	2,592	2,304	1,535
Czechoslovakia	4,650	4,532	1,074	413	.....
Denmark	799	1,147	69	59	65
Finland	976	1,262	78	21	154
France	59,342	68,503	3,301	3,393	4,420
Germany	49,078	45,488	3,226	2,889	4,227
Italy	17,169	18,570	809	812	.....
Japan	34,284	32,731	3,065	3,780	.....
Netherlands	3,022	2,924	41	‡57	191
Norway	813	1,143	64	46	53
Russia	12,626	16,229	3,141	3,137	.....
Spain	2,400	2,400	145	160	99
Sweden	3,857	4,414	218	195	299
Switzerland	653	808	63	57	.....
Others estimated†	7,000	7,200	*800	*800	*800
Totals	804,800	705,470	59,621	51,771	.....
Minus United States (Cons.)	472,000	376,107	32,217	27,828	23,845
Total foreign	332,800	329,363	27,404	23,943	.....

* Estimate to complete table. † Includes Argentina, Brazil, Chile, China, Cuba, Egypt, Estonia, Hungary, Latvia, Mexico, Poland, Portugal, and Union of South Africa.
‡ Indicating excess of reexports over imports.
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

London Stocks, September, 1931

	Landed Tons	Delivered Tons	Stocks September 30: 1931 Tons	1930 Tons	1929 Tons
LONDON					
Plantation	3,950	5,797	79,627	83,219	42,041
Other grades	27	46	35	52	54
LIVERPOOL					
Plantation	*1,248	*2,064	*54,612	*34,718	*10,026
Total tons, London and Liverpool	5,225	7,907	134,274	117,989	52,121

* Official returns from the recognized public warehouses.

Principal Rubber Stocks

Long Tons—1931

	May	June	July	Aug.	Sept.	Oct.
Malay Estates	21,901	22,101	23,116	23,855	22,036	.....
S. S. Dealers	40,069	42,066	42,649	42,393	38,411	39,497
Other Malay Dealers	15,270	16,647	17,261	16,751	15,078	.....
Malayan Ports	3,143	5,915	7,372	5,617	7,657	11,625
Totals	80,383	86,729	90,398	88,616	83,182	.....
London	86,726	83,071	81,317	81,560	*79,630	*76,725
Liverpool	53,668	53,975	54,833	55,428	*54,700	*56,800
Totals	140,394	137,046	136,150	136,988	*134,330	*133,525
U. S. Inventory	219,405	225,346	235,746	244,627	258,352	.....
U. S. Afloat	73,564	69,421	66,873	61,469	62,420	.....
Europe Afloat	17,770	18,440	19,960	18,880	*19,000	.....
Totals	91,334	87,861	86,833	80,349	*81,420	.....
Grand totals	531,516	536,982	549,127	550,580	*557,258	.....

*Estimate.
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S.W.1, England, gives the following figures for October, 1931:

Rubber Exports

Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham

October, 1931

To	Sheet and Crepe Rubber Tons	Latex Concentrated Latex and Revertex Tons
United Kingdom	4,529	73
United States	32,872	124
Continent of Europe	4,743	86
British possessions	872	..
Japan	1,802	4
Other countries	804	2
Totals	45,622	289

Rubber Imports

Actual Imports by Land and Sea

October, 1931

From	Dry Rubber Tons	Wet Rubber Tons
Sumatra	458	4,643
Dutch Borneo	411	2,505
Java and other Dutch Islands	32	23
Sarawak	850	22
British Borneo	202	19
Burma	138	13
Siam	208	130
French Indo China	225	25
Other countries	45	6
Totals	2,569	7,386

United States Crude and Waste Rubber Imports for 1931 by Months

	Plantations	Latex	Paras	Africans	Centrals	Manicobas and Matto Grosso: Guayule	Grosso	Totals: 1931	1930	Balata	Miscellaneous	Waste
January ...tons	36,525	206	331	36	..	..	..	37,098	47,362	65	960	38
February	35,749	339	516	40	1	..	..	36,645	43,728	1	580	..
March	38,922	352	1,062	2	..	..	..	40,338	45,430	170	800	..
April	46,034	323	291	..	..	..	..	46,648	49,927	196	908	60
May	30,962	248	508	2	..	..	..	31,720	40,745	78	450	2
June	44,495	601	640	40	..	..	..	45,776	42,653	271	892	6
July	40,477	316	211	..	..	..	..	41,004	34,084	131	519	6
August	37,920	328	121	1	..	..	..	38,370	34,558	82	375	13
September	39,831	341	294	39	..	..	..	40,505	39,467	89	592	20
October	40,462	238	695	..	..	..	..	41,395	43,729	28	719	36
Total, ten months, 1931 ...tons	391,377	3,292	4,669	160	1	....	..	399,499	.....	1,111	6,795	181
Total, ten months, 1930 ...tons	410,486	3,470	6,201	321	194	1,011	..	.....	421,683	1,037	7,312	462

Compiled from Rubber Manufacturers Association statistics.

Classified Advertisements

CONTINUED

MACHINERY AND SUPPLIES FOR SALE

FOR SALE Vulcanizing Oven 6 by 8 feet; 41-inch mill with motor complete; No. 1 Royle tuber, crescent head.
P. O. BOX 385, PAWTUCKET, R. I.

MISCELLANEOUS

WANTED SURPLUS Chemicals, Oils, Colors, Glues, Waxes, Metals, Rubber Goods, By-Products, Residues, Wastes, etc.
Chemical Service Corporation, 36 Park Row, New York, N. Y.

New and Used
RUBBER MACHINERY
M. Norton & Co.
Medford, Mass.

The Franz Foundry & Machine Co.
AKRON, OHIO

MOLDS, CORES AND RUBBER MACHINERY
HEATER PRESSES, ENGRAVING MACHINES
WATCH CASE HEATERS, RETREAD EQUIPMENT

FOR SALE

One John Robertson 1,000 tons lead press, 8" x 18"
One Birmingham 72 inches x 18'6 inches hydraulic belt press
One Farrel 42 inches x 18' hydraulic belt press
One Farrel 30 inches x 20' hydraulic belt press
Farrel & Birmingham 40"—42"—48" and 60" mills
Farrel & Birmingham 48" to 66" and 72" calenders
Two No. 3 Banbury mixers
Day Pony mixers six and eight quart size
Day Jacketed double arm, double geared dough mixers
W. & P. experimental mixers
Experimental two roll calender
Five American upright jacketed churns 36" x 48"
Fifteen churns 32" x 40"
Four Curtis Marble (Heath type) brush machines 64" to 88"
Two cloth windups 44 inches and 59 inches
Five American Machine Tool Co.'s spreaders 45" to 54"
One 59 inch doubling machine
Two three roll embossing calenders, 64 inches
Can drying machine
One four roll 12 inches x 30 inches shoe calender
Two Farrel 24 inches x 19 inches x 32 inches refiners
One Farrel cracker 22 inches x 22 inches x 31 inches
Birmingham refiner 18 inches x 14 inches x 30 inches
Forty Farrel hydraulic presses, 24" x 24" to 48" x 48"
Hydraulic pumps and accumulators
Two Morgan & Wright experimental tire vulcanizers

LAWRENCE N. BARRY, Inc., 41 Locust St., Medford, Mass.

Let me ✓

take care of your chemical work and manufacturing problems on a monthly fee basis.

Write for particulars

Frederick J. Maywald
Rubber Chemist
303 Hoboken Road Carlstadt, N. J.

UNITED

GUARANTEED REBUILT MACHINERY
Immediate Deliveries from Stock

MILLS—6"x12", 12"x24", 16"x36", 16"x42", 18"x50", 20"x22"x60", 22"x72", 24"x26"x84" Farrel, Thropp, Vaughn, Allen, W.S.M., Birmingham.
CALENDERS—100", 66", 60", 54", 48", 30", 24", in 2, 3, 4-Roll Farrel, Adamson, Vaughn.
TUBERS—Nos. 1, 2, 3, 4, Royle Perfected.
STRAINERS—6", 8", 10" Allen, Adamson, etc.
HYDRAULIC PRESSES—14"x14" (Ten Platens), 24"x24", 30"x30", 36"x36", 34"x34" (Seven Platens), 40"x40", 44"x44", 48"x48", etc.
MIXERS—4-100 gallon W.P. Mixers; 2-100 gallon Day Mixers, 50, 75, 200 gal.; other makes, Jacketed and Unjacketed.
PUMPS—High and low pressure Triplex, all sizes.
AIR COMPRESSORS—Ingersoll-Rand, Belt and Steam.
SLITTERS—Cameron, 50" and 60"; 64" Spadone Bias Cutter.
VULCANIZERS—Allen 5'x12' Quick Opening; 6'x24', 5'x40' Southwark, Birmingham.
REFINERS—14"x18"x24", 18"x22"x32", Farrel, Allen.
CRACKERS—16"x24", 16"x30" 16"x36" Birmingham.
TIRE EQUIPMENT—Banner Machines, Vertical Heaters, Molds, etc.

UNITED RUBBER MACHINERY EXCHANGE
319-323 Frelinghuysen Ave. NEWARK, N. J.
Cable Address "URME"

RE-BUILT AND NEW RUBBER MILL MACHINERY OF EVERY TYPE
GUARANTEED EQUIPMENT—PROMPT SHIPMENT

Factory Outfitters from a Bolt to a Complete Plant

We carry in stock on our warehouse floors all sizes and makes of:

Mills	Vulcanizers	Cement Churns	Air Compressors	Reduction Drives
Calenders	Washers	Pumps	Bias Cutters	Driers
Hydraulic Presses	Crackers	Accumulators	Banbury Mixers	Slitters, etc.

Warehouses
TRENTON, N. J.
AKRON, OHIO
COMPTON, CALIF.

WRITE—WIRE—CALL
L. ALBERT & SON
Main Office—Trenton, N. J.
Cable Address—Albertson

Great Britain Representative
FRANCIS PAISLEY
76 Maryon Road
London, S. E. 7, England

United States Statistics

Imports of Crude and Manufactured Rubber

	August, 1931		Eight Months Ended August, 1931	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	86,617,676	$5,138,404	714,871,747	$52,792,696
Liquid latex	816,010	60,358	7,608,795	686,254
Jelutong or pontianak	1,461,110	100,536	9,039,618	765,840
Balata	163,130	30,207	1,910,109	313,318
Gutta percha	54,661	6,057	233,431	28,699
Guayule	.....	.....	.....	.....
Siak, scrap, and reclaimed	792,526	5,190	6,061,912	58,124
Totals	89,905,113	$5,340,752	739,725,612	$54,644,931
Chicle, crude—*Free*	624,405	$277,305	6,472,733	$3,048,641
MANUFACTURED—*Dutiable*				
Tires—*number*	7,329	$5,670	21,623	$57,830
Other rubber manufactures	.....	53,184	.....	572,791
Totals	.....	$58,854	.....	$630,621

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	5,205,201	$345,953	41,924,111	$3,329,769
Balata	2,619	518	87,427	23,007
Guayule	5,600	686	31,400	4,398
Gutta percha, rubber substitutes, and scrap	.....	.....	10,122	1,802
Rubber manufactures	.....	6,478	.....	12,941
Totals	.....	$353,635	.....	$3,371,917

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed	917,917	$40,338	11,046,217	$522,873
Scrap and old	5,841,788	96,842	35,235,382	797,608
Rubberized automobile cloth, *sq. yd.*	84,802	34,583	658,567	292,110
Other rubberized piece goods and hospital sheetings *sq. yd.*	89,669	38,900	829,526	342,553
Footwear				
Boots—*pairs*	104,265	239,303	387,454	925,202
Shoes—*pairs*	78,880	64,393	543,936	392,073
Canvas shoes with rubber soles—*pairs*	98,015	53,591	1,234,149	778,531
Soles—*doz. pairs*	9,759	25,674	58,758	155,377
Heels—*doz. pairs*	47,415	29,810	526,619	346,219
Water bottles and fountain syringes—*number*	46,721	21,972	232,344	104,150
Gloves—*doz. pairs*	8,752	19,817	63,801	158,924
Other druggists' sundries	.....	22,964	.....	219,377
Balloons—*gross*	60,330	53,766	430,162	388,705
Toys and balls	.....	10,676	.....	85,312
Bathing caps—*doz.*	4,768	9,994	107,151	209,570
Bands	27,814	9,683	317,425	117,814
Erasers	21,449	14,049	290,106	174,223
Hard rubber goods				
Electrical goods	137,633	16,006	860,424	97,030
Other goods	.....	17,431	.....	166,037
Tires				
Truck and bus casings, *number*	26,442	456,639	279,300	5,591,657
Other automobile casings, *number*	116,904	880,288	1,044,094	7,929,682
Tubes, auto—*number*	99,096	122,603	865,250	1,166,640
Other casings and tubes, *number*	5,861	14,300	61,810	129,353
Solid tires for automobiles and motor trucks *number*	807	24,967	8,279	267,124
Other solid tires	139,380	16,339	1,115,176	152,515
Tire sundries and repair materials	.....	76,115	.....	591,328
Rubber and friction tape	87,668	21,249	805,898	219,844
Belting	262,526	107,649	2,359,922	1,036,592
Hose	341,606	99,688	3,529,003	1,043,999
Packing	97,031	42,254	928,306	386,054
Thread	111,113	70,689	1,027,779	854,147
Other rubber manufactures	.....	118,868	.....	1,149,810
Totals	.....	$2,871,440	.....	$26,792,433

Crude Rubber Imports by Customs Districts

Including latex dry rubber content

	September, 1931		September, 1930	
	Pounds	Value	Pounds	Value
Massachusetts	4,263,995	$335,075	3,665,738	$386,215
Buffalo	.....	.....	10,436	1,657
New York	70,097,623	4,017,646	70,661,662	7,636,949
Maryland	6,832,407	366,241	75,880	5,592
Georgia	161,280	7,816	1,125,357	101,508
Mobile	1,507,864	68,002	.....	.....
New Orleans	.....	.....	1,194,720	69,944
Los Angeles	3,579,212	204,113	3,047,179	343,864
San Francisco	145,600	8,054	192,811	23,572
Oregon	13,440	903	11,200	1,275
Ohio	224	14	.....	.....
Colorado	607,400	34,903	168,000	17,987
Totals	87,209,045	$5,042,767	80,152,983	$8,588,563

United Kingdom Statistics

Imports

	September, 1931		Nine Months Ended September, 1931	
UNMANUFACTURED				
Crude Rubber				
From	Pounds	Value	Pounds	Value
Straits Settlements	7,868,400	£86,149	107,668,200	£1,579,012
Federated Malay States	2,888,600	33,363	47,060,200	739,019
British India	769,700	7,961	10,199,200	151,197
Ceylon and Dependencies	1,228,100	13,458	18,878,100	288,228
Java and Dutch Borneo	2,037,500	26,697	23,024,300	352,013
Sumatra and other Dutch possessions in Indian Seas	679,800	8,413	12,300,500	193,156
Other countries in East Indies and Pacific, not elsewhere specified	168,400	2,008	2,880,700	44,854
Brazil	79,000	1,128	4,017,200	75,969
South and Central America (except Brazil)	.....	.....	42,400	595
West Africa				
French West and Equatorial Africa	.....	.....	25,400	444
Gold Coast	.....	.....	175,500	2,666
Other parts of West Africa	100,100	1,043	1,572,900	23,548
East Africa, including Madagascar	.....	.....	184,500	2,940
Other countries	172,100	2,385	984,400	17,681
Totals	15,991,700	£182,605	229,013,500	£3,471,322
Gutta percha and balata	211,900	16,426	2,307,400	157,857
Waste and reclaimed rubber	454,900	4,143	5,720,900	53,352
Rubber substitutes, synthetic	700	15	13,700	370
Totals	16,659,200	£203,189	237,055,500	£3,682,901
MANUFACTURED				
*Tires and tubes				
Pneumatic				
Outer covers	.....	£21,340	.....	£160,654
Inner tubes	.....	7,104	.....	49,449
Solid tires	.....	4,381	.....	30,641
Boots and shoes—*doz. pairs*	75,063	137,669	964,719	1,152,059
Other rubber manufactures	.....	146,654	.....	1,315,025
Totals	.....	£317,148	.....	£2,707,828

Exports

UNMANUFACTURED				
Waste and reclaimed rubber	1,110,000	£6,648	10,827,000	£68,316
Rubber substitutes, synthetic	20,600	357	310,100	6,068
Totals	1,130,600	£7,005	11,137,100	£74,384
MANUFACTURED				
Tires and tubes				
Pneumatic				
Outer covers	.....	£216,515	.....	£2,219,169
Inner tubes	.....	23,129	.....	269,257
Solid tires	.....	3,837	.....	41,920
Boots and shoes—*doz. pairs*	12,715	20,617	140,997	180,966
Other rubber manufactures	.....	126,376	.....	1,470,181
Totals	.....	£390,474	.....	£4,181,493

Exports—Colonial and Foreign

UNMANUFACTURED				
Crude Rubber				
To				
Soviet Union (Russia)	3,400	£56	21,245,000	£504,092
Sweden, Norway, and Denmark	105,400	2,482	1,556,500	31,726
Germany	1,085,300	15,770	14,550,300	235,068
Belgium	677,600	9,362	7,723,700	125,897
France	943,500	13,605	11,947,800	216,971
Spain	60,100	1,478	835,700	22,132
Italy	113,000	2,058	3,059,200	49,525
Other European countries	507,800	8,696	2,697,500	61,054
United States	176,800	1,783	1,944,200	42,524
Other countries	70,100	1,421	1,179,900	28,779
Totals	3,743,000	£56,711	66,739,800	£1,317,768
Gutta percha and balata	22,900	928	397,800	35,076
Waste and reclaimed rubber	11,700	207	162,000	2,312
Rubber substitutes, synthetic	.....	.....	1,400	18
Totals	3,777,600	£57,846	67,301,000	£1,355,174
MANUFACTURED				
Tires and tubes				
Pneumatic				
Outer covers	.....	£863	.....	£58,287
Inner tubes	.....	197	.....	3,177
Solid tires	.....	.....	.....	215
Boots and shoes—*doz. pairs*	2,026	4,372	21,442	26,352
Other rubber manufactures	.....	6,055	.....	45,567
Totals	.....	£11,487	.....	£133,598

*Motor cars, motorcycles, parts, and accessories were liable to duty from Sept. 29, 1915, until Aug. 1, 1924, inclusive, and after July 1, 1925. Commercial vehicles, parts, and accessories were exempt from duty until Apr. 30, 1926, inclusive, and tires and tubes until Apr. 11, 1927, inclusive.

AN EMPLOYE WORKING ON A LINER REROLLING MACHINE CAUGHT HIS LEFT index finger between a bar and a standard as he was putting the liner into the standard. 300 days were charged to this injury as it was necessary to amputate part of the injured finger. National Safety Council, Rubber Section, *News Letter*.

BUYERS' GUIDE

Alphabetical list of the advertisers who manufacture and deal in rubber goods, rubber machinery, equipment, supplies and compounding ingredients. If unable to find what you want, communicate with us and we will try to help you. This list is for the convenience of our readers, and not a part of the advertisers' contract. INDIA RUBBER WORLD assumes no responsibility to advertisers for its correctness.

ACCELERATORS.
Du Pont, E. I., de Nemours & Co., Inc., Wilmington, Del.
Grasselli Chemical Co., The, Cleveland, Ohio.
Hall, C. P., Co., The, Akron, Ohio.
Naugatuck Chemical Co., New York, N. Y.
Vanderbilt, R. T., Co., Inc., New York.

ACCESSORIES—Automobile.
General Tire & Rubber Co., Akron, Ohio.
Gutta Percha & Rubber, Ltd., Toronto, Canada.
Jenkins Bros., New York, N. Y.

ACCUMULATORS—Hydraulic.
Adamson Machine Co., The, Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
Baldwin-Southwark Corporation, Southwark Fdy. & Machine Co. Division, Philadelphia, Pa.
Dunning & Boschert Press Co., Inc., Syracuse, N. Y.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
French Oil Mill Machinery Co., The, Piqua, Ohio.
Nagle Machine Co., Erie, Pa.
Robertson, John, Co., Inc., Brooklyn, N. Y.
Thropp, Wm. R., & Sons Co., Trenton, N. J.
Utility Manufacturing Co., Cudahy, Wis.
Wood, R. D., & Co., Philadelphia, Pa.

ACIDS.
Grasselli Chemical Co., The, Cleveland, Ohio.
Naugatuck Chemical Co., New York, N. Y.
Whittaker, Clark & Daniels, Inc., New York, N. Y.
Wishnick-Tumpeer, Inc., New York.

ACTICARBONE.
Societe de Recherches et d'Exploitations Petroliferes, Paris (16e), France.

AGING APPARATUS.
Emerson Apparatus Co., Melrose, Mass.

ALPHABETS and FIGURES—Steel.
Hoggson & Pettis Mfg. Co., The, New Haven, Conn.

ALUMINUM FLAKE.
Aluminum Flake Co., The, Akron, Ohio.

ANTIMONY—Golden and Crimson.
Rare Metal Products Co., Belleville, N. J.
Whittaker, Clark & Daniels, Inc., New York, N. Y.
Wishnick-Tumpeer, Inc., New York.

ANTIOXIDANT.
Du Pont, E. I., de Nemours & Co., Inc., Wilmington, Del.
Hall, C. P. Co., The, Akron, Ohio.
Naugatuck Chemical Co., New York, N. Y.
Vanderbilt, R. T. Co., Inc., New York.

APRONS—Mixing Mill.
Albert, L., & Son, Trenton, N. J.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

APRONS—Rubber.
Aldan Rubber Co., Philadelphia, Pa.
Archer Rubber Co., Milford, Mass.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Canfield Rubber Co., The, Bridgeport, Conn.
Chicago Rubber Clothing Co., Racine, Wis.
Davol Rubber Co., Providence, R. I.
Plymouth Rubber Co., Inc., Canton, Mass.
Rand Rubber Co., Inc., Brooklyn, N. Y.

ASBESTINE.
International Pulp Co., New York.

ASPHALTS.
Barber Asphalt Co., Philadelphia, Pa.
Hall, C. P., Co., The, Akron, Ohio.
Wishnick-Tumpeer, Inc., New York, N. Y.

AUTO TOP FABRICS.
Aldan Rubber Co., Philadelphia, Pa.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Plymouth Rubber Co., Inc., Canton, Mass.
Pocono Rubber Cloth Co., The, Trenton, N. J.

BABY PANTS.
Archer Rubber Co., Milford, Mass.
Canfield Rubber Co., The, Bridgeport, Conn.
Davol Rubber Co., Providence, R. I.
Plymouth Rubber Co., Inc., Canton, Mass.
Rand Rubber Co., Inc., Brooklyn, N. Y.

BACKING CLOTH.
Aldan Rubber Co., Philadelphia, Pa.

BALATA.
Hankin, Geo., & Co., London, England.
Jacoby, Ernest, Boston, Mass.
Weber, Hermann, Hoboken, N. J.
Wood, Chas. E., Inc., New York, N. Y.

BALATA—Refined.
Wood, Chas. E., Inc., New York, N. Y.

BALLS—Billiard, Bowling, etc.
Stowe & Woodward Co., Newton Upper Falls, Mass.

BALLS—Tank.
Canfield, H. O., Co., The, Bridgeport, Conn.
Canfield Rubber Co., The, Bridgeport, Conn.
Jenkins Bros., New York, N. Y.

BALLS, DOLLS AND TOYS.
Jenkins Bros., New York, N. Y.

BAND CUTTING MACHINES.
Adamson Machine Co., The, Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
Black Rock Mfg. Co., Bridgeport, Conn.

BARYTES.
Grasselli Chemical Co., The, Cleveland, Ohio.
Hall, C. P., Co., The, Akron, Ohio.
Hammill & Gillespie, Inc., New York, N. Y.
Whittaker, Clark & Daniels, Inc., New York.
Williams, C. K., & Co., Easton, Pa.
Wishnick-Tumpeer, Inc., New York.

BATH MATS—Sponge Rubber.
Rand Rubber Co., Inc., Brooklyn, N. Y.

BATHING CAPS.
Davidson Rubber Co., Boston, Mass.
Davol Rubber Co., Providence, R. I.
Plymouth Rubber Co., Inc., Canton, Mass.

BATHING SPECIALTIES.
Plymouth Rubber Co., Inc., Canton, Mass.

BEAD BUILDING MACHINES.
Albert, L., & Son, Trenton, N. J.
National Rubber Machinery Co., Akron, Ohio.
Utility Manufacturing Co., Cudahy, Wis.

BEAD FLIPPERS.
Albert, L., & Son, Trenton, N. J.
Utility Manufacturing Co., Cudahy, Wis.

BELT MAKING MACHINES.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

BELTING—Rubber.
Acme Rubber Mfg. Co., Trenton, N. J.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Gutta Percha & Rubber, Ltd., Toronto, Canada.
Home Rubber Co., Trenton, N. J.
Jenkins Bros., New York, N. Y.
Thermoid Rubber Co., Trenton, N. J.

BENTONITE.
Hammill & Gillespie, Inc., New York, N. Y.

BENZOL.
Wishnick-Tumpeer, Inc., New York.

BLANC FIXE.
Grasselli Chemical Co., The, Cleveland, Ohio.
Hall, C. P., Co., The, Akron, Ohio.
Huber, J. M., Inc., New York, N. Y.
Whittaker, Clark & Daniels, Inc., New York.
Wishnick-Tumpeer, Inc., New York.

BLANKETS—Printers'.
Boston Woven Hose & Rubber Co., Cambridge, Mass.

BOILERS.
Akron Equipment Co., The, Akron, Ohio.
Biggs Boiler Works Co., The, Akron, Ohio.

BOOTS AND SHOES.
Gutta Percha & Rubber, Ltd., Toronto, Canada.

BRAIDERS—Hose.
Albert, L., & Son, Trenton, N. J.
New England Butt Co., Providence, R. I.

BRAKE LINING—Asbestos and Industrial.
Garlock Packing Co., The, Palmyra, N. Y.
Thermoid Rubber Co., Trenton, N. J.

BRANDS—Rubber Labels.
Naugatuck Chemical Co., New York, N. Y.

BREAKER AND CHAFER FABRIC.
Lane, J. H., & Co., New York and Chicago.

BRUSHING MACHINES AND BRUSHES.
Albert, L., & Son, Trenton, N. J.
Curtis & Marble Machine Co., Worcester, Mass.

BUFFING MACHINES.
Albert, L., & Son, Trenton, N. J.
Emerson Apparatus Co., Melrose, Mass.
Utility Manufacturing Co., Cudahy, Wis.

BULBS.
Davol Rubber Co., Providence, R. I.
Jenkins Bros., New York, N. Y.
Whitall Tatum Co., New York.

CADMIUM YELLOW.
Grasselli Chemical Co., The, Cleveland, Ohio.
Hammill & Gillespie, Inc., New York, N. Y.
Wishnick-Tumpeer, Inc., New York.

CALENDER SCREW-DOWN—Motor Driven.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

CALENDER SHELLS.
Albert, L., & Son, Trenton, N. J.
Gammeter, W. F., Co., The, Cadiz, Ohio.
National Sherardizing & Machine Co., The, Hartford, Conn.

CALENDERED GOODS.
Archer Rubber Co., Milford, Mass.
Canfield Rubber Co., Bridgeport, Conn.
Chicago Rubber Clothing Co., Racine, Wis.
Jenkins Bros., New York, N. Y.
Plymouth Rubber Co., Inc., Canton, Mass.
Pocono Rubber Cloth Co., The, Trenton, N. J.
Rand Rubber Co., Inc., Brooklyn, N. Y.

CALENDERS.
Adamson Machine Co., The, Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
Bolling, Stewart, & Co., Inc., Cleveland, Ohio.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Nagle Machine Co., Erie, Pa.
Thropp, William R., & Sons Co., Trenton, N. J.

(Firms Listed above Advertise in This Issue—For Complete Addresses See Advertisements—Index Page 126)

Plantation Rubber Crop Returns by Months

Summary of 615 Producing Companies

	Br. N. Borneo (26 Companies)		Ceylon (102 Companies)		India and Burma (21 Companies)		Malaya (338 Companies)		Netherlands East Indies — Java (60 Companies)		Netherlands East Indies — Sumatra (60 Companies)		Miscellaneous (8 Companies)		Total (615 Companies)	
	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index
1931																
January	473	96.7	1,776	87.0	397	70.6	13,006	104.6	3,020	115.0	4,324	107.2	225	124.3	23,221	103.8
February	365	74.6	1,138	55.8	160	28.5	11,551	92.9	2,631	100.2	3,721	92.3	130	71.8	19,696	88.1
March	378	77.3	1,065	52.2	510	90.7	11,439	92.0	3,174	120.9	4,173	103.5	182	100.6	20,921	93.6
April	351	71.8	1,699	83.2	672	119.6	10,423	83.8	3,069	116.9	3,726	92.4	208	114.9	20,148	90.1
May	428	87.5	1,340	65.7	655	116.5	11,669	93.8	3,235	123.2	4,076	101.1	207	114.4	21,610	96.6
June	411	84.0	888	43.5	232	41.3	11,752	94.5	3,043	115.9	4,224	104.8	208	114.9	20,758	92.8
July	403	82.4	1,234	60.5	213	37.9	13,249	106.6	3,042	115.8	4,476	111.0	213	117.7	22,830	102.1
August	408	83.4	1,136	55.7	108	19.2	13,087	105.3	2,340	89.1	4,586	113.7	209	115.5	21,874	97.8
September	360	73.6	1,288	63.1	283	50.4	12,696	102.1	2,385	90.8	4,537	112.5	187	103.3	21,736	97.2
October	365	74.6	1,440	70.6	338	60.1	13,271	106.7	2,723	103.7	4,773	118.4	202	111.6	23,112	103.3
Ten months ending October, 1931	3,942	....	13,004	....	3,568	....	122,143	....	28,662	....	42,616	....	1,971	....	215,906	....

NOTE. Index figures throughout are based on the monthly average for 1929=100. Issued November 10, 1931, by the Commercial Research Department, The Rubber Growers' Association, Inc., London, England.

Rubber Goods Production Statistics

		1931									1930			
TIRES AND TUBES		Sept.	Aug.	July	June	May	Apr.	Mar.	Feb.	Jan.	Dec.	Nov.	Oct.	Sept.
Pneumatic casings														
Production	*thousands*	....	3,125	3,941	4,538	4,543	3,955	3,730	3,188	2,940	2,251	2,123	2,866	2,692
Shipments														
Domestic	*thousands*	....	3,845	4,244	4,320	4,197	3,804	3,143	2,580	2,855	2,550	2,119	2,613	3,360
Exports	*thousands*	....	123	125	137	135	142	155	142	140	139	148	186	165
Stocks, end of month	*thousands*	....	7,117	7,936	8,358	8,250	8,025	8,012	7,629	7,166	7,203	7,676	7,842	7,849
Solid and cushion tires														
Production	*thousands*	....	12	13	12	11	12	11	11	13	13	13	18	14
Shipments														
Domestic	*thousands*	....	15	15	14	14	14	15	12	12	12	13	19	22
Exports	*thousands*	....	1	1	1	1	1	1	1	1	1	1	1	1
Stocks, end of month	*thousands*	....	51	55	57	61	64	69	73	75	76	76	78	82
Inner tubes														
Production	*thousands*	....	3,548	3,964	4,286	4,330	3,693	3,560	3,133	2,898	2,448	2,144	3,161	3,053
Shipments														
Domestic	*thousands*	....	4,158	4,569	4,228	4,135	3,610	2,922	2,619	3,147	2,634	2,147	2,659	3,525
Exports	*thousands*	....	82	96	89	89	99	109	101	102	96	84	119	108
Stocks, end of month	*thousands*	....	7,019	7,672	8,403	8,439	8,330	8,380	7,937	7,552	7,999	8,250	8,414	8,052
Raw material consumed														
Fabrics	*thous. of lbs.*	....	11,745	15,140	17,085	18,010	15,244	14,041	12,002	12,738	8,358	8,418	11,780	10,917
Crude rubber	*thous. of lbs.*	....	36,232	46,697	51,280	53,418	45,016	41,851	36,651	36,319	25,537	26,253	36,097	33,382
MISCELLANEOUS RUBBER PRODUCTS														
Calendered rubber clothing														
Net orders	*no. coats and sundries*	23,966	21,580	17,932	21,161	19,380	16,846	19,380	16,361	21,884	12,881	15,493	25,082	39,364
Production	*no. coats and sundries*	22,728	27,080	14,431	15,419	18,094	16,803	19,220	18,276	13,059	20,791	22,623	41,291	37,097
Mechanical rubber goods, shipments														
Belting	*thous. of dollars*	....	802	914	798	790	832	889	722	759	675	779	954	1,045
Hose	*thous. of dollars*	....	1,161	1,436	1,650	1,857	2,129	1,892	1,611	1,440	1,337	1,276	1,554	1,473
All other	*thous. of dollars*	....	1,393	1,356	1,431	1,584	1,656	1,631	1,378	1,400	1,326	1,345	1,678	1,565
Total	*thous. of dollars*	....	3,356	3,706	3,879	4,231	4,617	4,412	3,711	3,599	3,338	3,400	4,186	4,083
Rubber bands, shipments	*thous. of lbs.*	201	195	246	209	215	259	231	222	211	165	165	197	172
Rubber flooring, shipments	*thous. of sq. ft.*	595	595	577	576	569	569	496	366	365	597	432	682	529
Rubber and canvas footwear														
Tennis														
Production	*thous. of pairs*	....	1,021	836	1,999	2,142	2,591	2,609	2,492	2,409	1,875	1,940	1,821	1,445
Shipments, domestic	*thous. of pairs*	....	1,223	1,520	2,657	4,372	3,624	2,879	2,343	2,318	871	319	562	1,441
Exports	*thous. of pairs*	....	29	125	100	121	150	236	200	110	175	148	263	350
Stocks	*thous. of pairs*	....	5,704	5,957	6,766	7,523	9,889	10,960	11,451	11,506	11,633	10,712	9,239	8,248
Waterproof, total														
Production	*thous. of pairs*	....	2,361	1,570	1,922	1,261	1,102	874	958	1,272	2,214	2,736	2,960	2,822
Shipments, domestic	*thous. of pairs*	....	2,842	1,510	1,173	626	1,070	944	1,015	1,549	3,888	4,212	5,299	4,968
Exports	*thous. of pairs*	....	151	117	108	50	72	53	92	74	63	135	287	548
Stocks	*thous. of pairs*	....	16,366	16,978	16,763	16,357	15,733	15,803	16,030	16,179	17,172	18,449	20,054	22,680
Grand total														
Production	*thous. of pairs*	....	3,382	2,407	3,921	3,402	3,693	3,483	3,450	3,681	4,089	4,675	4,781	4,267
Shipments, domestic	*thous. of pairs*	....	4,065	3,030	3,830	4,998	4,694	3,822	3,358	3,867	4,759	4,531	5,861	6,409
Exports	*thous. of pairs*	....	180	242	208	171	222	288	292	184	237	282	550	898
Stocks	*thous. of pairs*	....	22,070	22,935	23,528	23,881	25,622	26,762	27,481	27,685	28,806	29,160	29,293	30,928
Rubber heels														
Production	*thous. of pairs*	15,827	16,293	15,361	17,093	15,474	15,408	14,661	13,156	12,973	13,101	11,083	16,460	14,322
Shipments														
Exports	*thous. of pairs*	501	514	540	630	612	578	577	658	748	838	880	966	1,083
Repair trade	*thous. of pairs*	6,994	5,355	4,058	4,946	3,975	4,038	4,868	4,854	3,939	3,450	4,473	8,291	6,681
Shoe manufacturers	*thous. of pairs*	9,724	11,653	11,177	10,522	9,693	10,112	10,991	8,397	8,471	6,618	4,578	9,354	9,244
Stocks, end of month	*thous. of pairs*	23,952	25,832	27,006	27,898	28,491	27,764	26,708	29,335	30,302	29,741	29,130	29,353	31,601
Rubber-proofed fabrics, production														
Auto fabrics	*thous. of yds.*	....	596	531	701	982	710	738	644	577	476	532	915	733
Raincoat fabrics	*thous. of yds.*	....	2,226	1,843	1,355	1,066	1,040	863	567	738	697	1,426	3,040	3,249
All other	*thous. of yds.*	....	965	963	1,156	1,002	1,271	1,168	973	891	736	864	1,254	1,064
Total	*thous. of yds.*	....	3,787	3,337	3,212	3,050	3,381	2,769	2,184	2,206	1,909	2,822	5,209	5,046
Rubber soles														
Production	*thous. of pairs*	2,880	2,933	2,864	3,177	2,885	2,692	2,292	2,724	2,481	3,021	1,426	3,056	2,193
Shipments														
Exports	*thous. of pairs*	90	67	67	59	62	69	14	36	11	58	60	82	74
Repair trade	*thous. of pairs*	290	234	196	225	330	255	408	290	287	243	280	492	333
Shoe manufacturers	*thous. of pairs*	2,640	2,790	2,569	2,899	2,651	2,474	2,145	2,259	2,090	2,305	1,011	2,638	1,691
Stocks, end of month	*thous. of pairs*	2,264	2,395	2,475	2,461	2,655	2,764	2,876	3,167	3,032	2,917	2,390	2,520	2,729

Source: *Survey of Current Business*, Bureau of Foreign and Domestic Commerce, Washington, D. C.